Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

August 25, 2022

Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: **Notice of Exempt Modification for T-Mobile: CT11604B**
Crown Site ID# 876382
1684 Chamberlin Highway, Berlin, CT 06037
Latitude: 41° 35′ 23.07″ / Longitude: -72° 48′ 19.20″

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 121' mount level on the existing 133' monopole tower located at 1684 Chamberlin Highway, Berlin, CT. The property is owned by Ronald & Arlene Laviana and the tower is owned by Crown Castle. T-Mobile now intends to replace three (3) antennas, add six (6) new antennas and ancillary equipment and install at the 121' level of the tower. T-Mobile to remove all antenna equipment at the 101' level of the tower. This modification/proposal includes hardware that is both 4G (LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times.

Panned Modification:

Tower:

Installed New:
(3) Ericsson Air 6419 B41 Antennas
(3) Commscope- W-65B-R1 Antennas
(3) RFS APXAALL24-43-U-NA20
(3) Ericsson-Radio 4460 B25+ B66 RRU
(3) Ericsson-Radio 4480 B71+ B85 RRU
(3) Hybrid Cable 6x24
Mount Modification

Remove:
(3) RFS APX16DWV-S-E-A20 Antennas
(3) Generic Twin Style 3CX-PCS/AWS3+600/700BP
(3) Generic Twin Style 1B-AWS TMAs
(12) Coaxial Cables 1-5/8"
Remove Antenna Mount Arms

Ground:

Install New

(1) 6160 Cabinet
(1.) B160 Battery Cabinet
(2) RP 6651
(3) PSU 4813 vR2A
(1) CRS IXRc V2

Remove:

(1) Equipment Cabinet

The original facility was approved by the Town of Berlin Planning and Zoning Commission on March 23, 2000, via Grant of Special Permit. Notice of Decision dated April 11, 2000 is the only record able to be located.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mark H Kaczynski, Mayor, Town of Berlin, CT, Maureen Giusti, Town Planner/ZEO, Town of Berlin, CT and Ronald & Arlene Laviana, property owner. Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Site Acquisition Specialist
1800 W. Park Drive
Westborough, MA 01581
(781) 970-0053
Jeff.Barbadora@crowncastle.com

Attachments
cc:

Mark H Kaczynski, Mayor
Town of Berlin
240 Kensington Road
Berlin, CT 06037
860-878-7000

Maureen Giusti, Town Planner/ZEO
Town of Berlin
240 Kensington Road
Berlin, CT 06037
860-878-7000

Ronald & Arlene Laviana
1684 Chamberlin Highway
Berlin, CT 06037

Crown Castle, Tower Owner

VOL. 433 PAGE 0333

Town of Berlin

Department of Development Services

April 11, 2000

NOTICE OF DECISION

BERLIN PLANNING AND ZONING COMMISSION

Application: Special Permit - #00-02-SP

Applicant: SPRINT Spectrum L.P. dba SPRINT PCS

Location: Lot 17, Block 15, Chamberlain Highway

At its Regular Meeting of March 23, 2000, the Berlin Planning and Zoning voted five to two to grant the Special Permit Application of SPRINT Spectrum L.P., d/b/a SPRINT PCS for a telecommunications tower and related equipment at Lot 17, Block 15, Chamberlain Highway.

Brian J. Miller, AICP
Director of Development Services

Lawrence J. & Nellie C. Laviana
Owner of Record

Certified Mail (Return Receipt Requested): 7099 3400 0001 5361 6271

Visit Our Web Site: http://www.edc.ci.berlin.ct.us

Town of Berlin, Connecticut • Planning and Zoning Commission
240 Kensington Road • Berlin, CT 06037 • (860) 828-7060 • Fax (860) 828-7180

RECEIVED May 3 20 00
AT 12 HR 58 MIN p.m.
AND RECORDED IN
BERLIN LAND RECORDS
VOL 433 PAGE 333
Cheryl Deftu
ASST TOWN CLERK

Town of Berlin, CT

Property Listing Report

Map Block Lot	19-4-15-17	Building #	1	PID	3445	Account	1036200

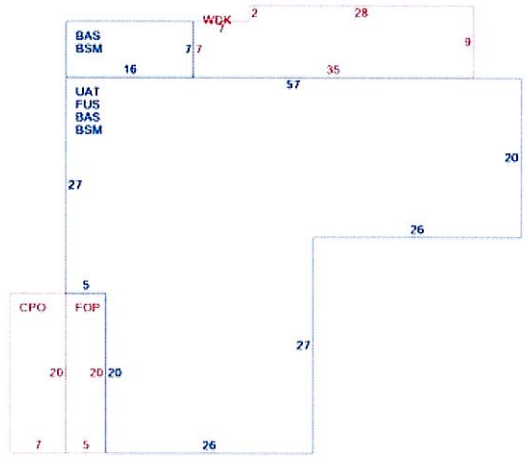
Property Information

Property Location	1684 CHAMBERLAIN HWY
Owner	LAVIANA RONALD L & ARLENE G
Co-Owner	
Mailing Address	1684 CHAMBERLAIN HWY KENSINGTON CT 06037
Land Use	1070 SFR w/Apt
Land Class	R
Zoning Code	MR-1
Census Tract	4002

District	0
Acreage	65.05
Utilities	Gas,Well,Septic
Book / Page	0456/0137

Photo

Sketch



Primary Construction Details

Year Built	1800
Building Desc.	SFR w/Apt
Building Style	Colonial
Stories	2
Occupancy	1.00
Exterior Walls	Vinyl Siding
Exterior Walls 2	
Roof Style	Gable
Roof Cover	Asph/F Gls/Cmp
Interior Walls	Drywall
Interior Walls 2	
Interior Floors 1	Carpet
Interior Floors 2	

Heating Fuel	Gas/Oil
Heating Type	Hot Water
AC Type	None
Bedrooms	6 Bedrooms
Full Bathrooms	3
Half Bathrooms	0
Extra Fixtures	0
Total Rooms	12
Bath Style	Average
Kitchen Style	Average
Fin BSMT Area	
Fin BSMT Quality	
Fin BSMT Area 2	
Fin BSMT Qual 2	

BSMT Garages	0
Fireplaces	2
Whirlpool Tub	0
Building Use	Residential
Building Condition	A

Industrial / Commercial Details
(*Residential Not Applicable)

Heat / AC	NA
Frame Type	NA
Baths / Plumbing	NA
Ceiling / Wall	NA
Rooms / Prtns	NA
Wall Height	NA
First Floor Use	NA

Report Created On 8/25/2022

Town of Berlin, CT

Property Listing Report

Map Block Lot	19-4-15-17	Building #	1	PID	3445	Account	1036200

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	210800	147600
Extras	7500	5300
Improvements		
Outbuildings	276700	193700
Land	1481400	122176
Total	1976400	468776

Outbuilding and Extra Features

Type	Description
Barn 1 Story	638 S.F.
Barn 1 Sty w/Bsm	2100 S.F.
Garage - Avg	504 S.F.
Shed Wd Res	420 S.F.
Cell Tower	150 L.F.
Generator	22 UNITS

Sub Areas

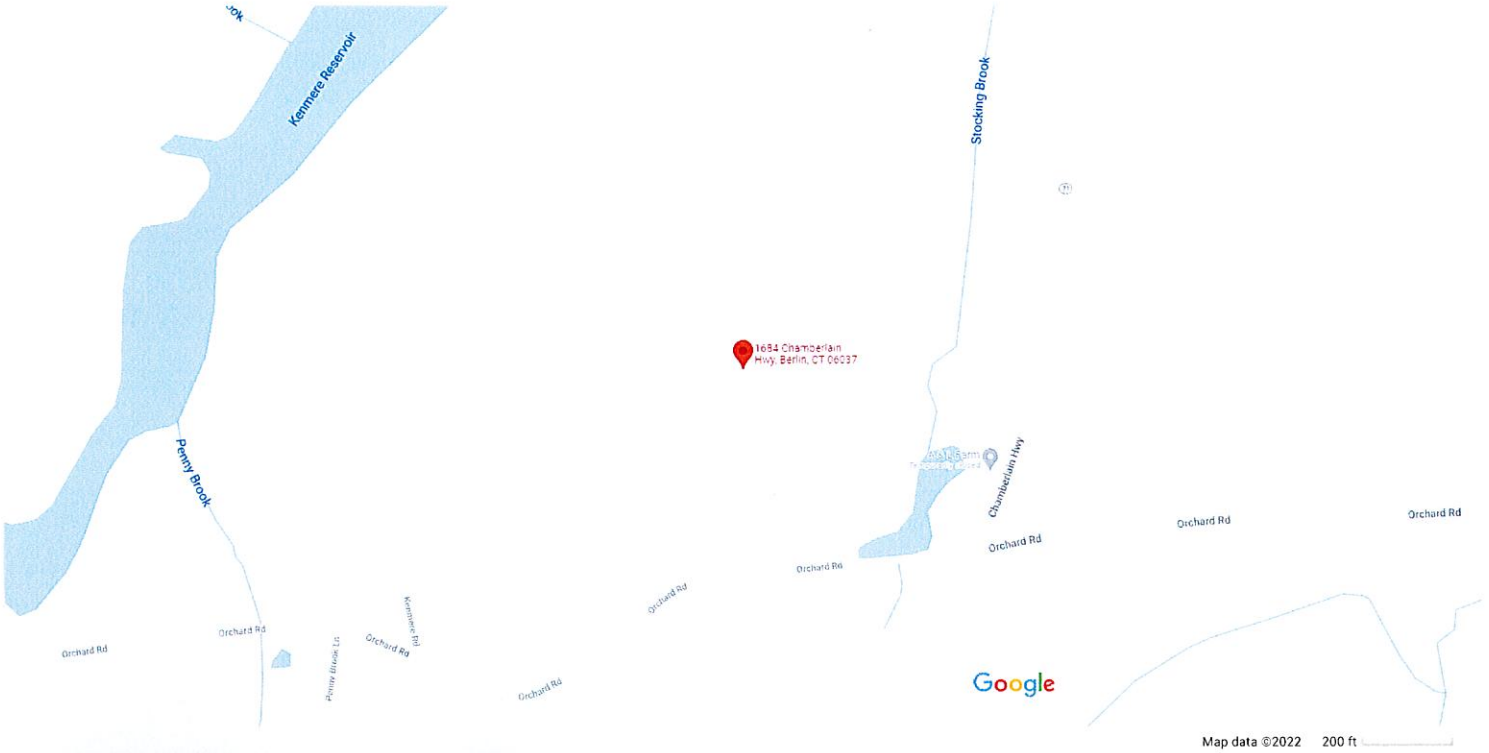
Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	1989	1989
Attic, Unfinished	1877	0
Concrete Patio	140	0
Porch, Open, Finished	100	0
Upper Story, Finished	1877	1877
Deck, Wood	301	0
Basement	1989	0
Total Area	8273	3866

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
LAVIANA RONALD L & ARLENE G	0456/0137	2001-09-19	0
LAVIANA,LAWRENCE,,	0088/0223	1944-04-23	0

Report Created On 8/25/2022

1684 Chamberlain Hwy



1684 Chamberlain Hwy

Directions Save Nearby Send to phone Share

1684 Chamberlain Hwy, Berlin, CT 06037

H5RW+QQ Berlin, Connecticut

Photos

Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Friday, August 26, 2022 10:28 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 777764570191: Your package has been delivered

Hi. Your package was delivered Fri, 08/26/2022 at 10:18am.

Delivered to 240 KENSINGTON RD, BERLIN, CT 06037
Received by K.KARA

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER 777764570191

FROM	Jeff Barbadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
TO	Town of Berlin Mark Kaczynski, Mayor 240 Kensington Road BERLIN, CT, US, 06037
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Thu 8/25/2022 05:43 PM
DELIVERED TO	Receptionist/Front Desk
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	BERLIN, CT, US, 06037
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	0.50 LB
SERVICE TYPE	FedEx Priority Overnight

Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Friday, August 26, 2022 10:28 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 777764594269: Your package has been delivered

Hi. Your package was delivered Fri, 08/26/2022 at 10:18am.

Delivered to 240 KENSINGTON RD, BERLIN, CT 06037
Received by K.KARA

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER 777764594269

FROM	Jeff Barbadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
TO	Town of Berlin Maureen Giusti, Town Planner/ZEO 240 Kensington Road BERLIN, CT, US, 06037
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Thu 8/25/2022 05:43 PM
DELIVERED TO	Receptionist/Front Desk
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	BERLIN, CT, US, 06037
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	0.50 LB
SERVICE TYPE	FedEx Priority Overnight

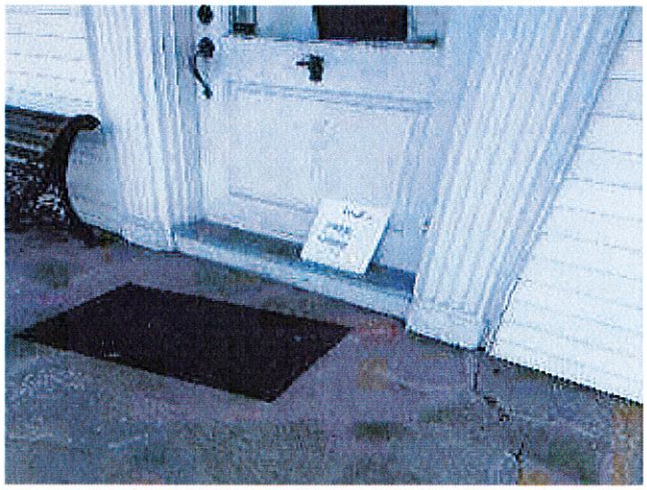
Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Friday, August 26, 2022 10:45 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 777764638478: Your package has been delivered
Attachments: DeliveryPicture.jpeg

Hi. Your package was delivered Fri, 08/26/2022 at 10:38am.

Delivered to 1684 CHAMBERLAIN HWY, BERLIN, CT 06037

OBTAIN PROOF OF DELIVERY



Delivery picture not showing? View in browser.

TRACKING NUMBER	777764638478
FROM	Jeff Barbadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
TO	Property Owner Ronald & Arlene Laviana 1684 Chamberlin Highway BERLIN, CT, US, 06037
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Thu 8/25/2022 05:43 PM
DELIVERED TO	Residence
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	BERLIN, CT, US, 06037
SPECIAL HANDLING	Deliver Weekday Residential Delivery
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	0.50 LB
SERVICE TYPE	FedEx Priority Overnight

Date: **June 28, 2022**

MORRISON HERSHFIELD

Morrison Hershfield
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
(770) 379-8500

Subject:	**Structural Analysis Report**	
Carrier Designation:	**Site Number:**	CT11604B
	Site Name:	CTNH614A
Crown Castle Designation:	**BU Number:**	876382
	Site Name:	Berlin / Laviana Orchard
	JDE Job Number:	721118
	Work Order Number:	2131444
	Order Number:	621160 Rev. 1
Engineering Firm Designation:	**Morrison Hershfield Project Number:** CN11-646R2 / 2200039	
Site Data:	**1684 Chamberlain Highway, Berlin, Hartford County, CT 6037** **Latitude *41° 35' 23.07"*, Longitude *-72° 48' 19.20"*** **133 Foot - Summit Monopole Tower**	

Morrison Hershfield is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity - 99.2%**

***The Structure has Sufficient Capacity once the changes, described in the Recommendations section of this report, are completed.**

This analysis utilizes an ultimate 3-second gust wind speed of 118 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

G. Lance Cooke, P.E. (CT License No. PEN.0028133)
Senior Engineer

Digitally signed by G. Lance Cooke
Date: 2022.06.28 08:53:01-07'00'

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA
Table 1 - Proposed Equipment Configuration
Table 2 - Non-Carrier Equipment To Be Conditionally Removed
Table 3 - Other Considered Equipment

3) ANALYSIS PROCEDURE
Table 4 - Documents Provided
3.1) Analysis Method
3.2) Assumptions

4) ANALYSIS RESULTS
Table 5 - Section Capacity (Summary)
Table 6 - Tower Component Stresses vs. Capacity - LC7
4.1) Recommendations

5) APPENDIX A
tnxTower Output

6) APPENDIX B
Base Level Drawing

7) APPENDIX C
Additional Calculations

1) INTRODUCTION

This tower is a 123 ft Summit monopole tower designed by Paul J. Ford and Company and mapped by Tower Engineering Professionals, Inc., in August of 2018.

The tower was modified multiple times in the past to accommodate additional loading. All the modifications are considered in this analysis per their respective post modification inspection reports.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	118 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
120.0	121.0	3	commscope	VV-65B-R1_TMO w/ Mount Pipe	3	1-5/8
		3	ericsson	AIR 6419 B41_TMO w/ Mount Pipe		
		3	rfs/celwave	APXVAALL24_43-U-NA20_TMO w/ Mount Pipe		
		3	ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	ericsson	Radio 4480_TMOV2		
	120.0	3	-	Site Pro 1 P30174		
		1	-	Site Pro 1 AHCP		
		1	-	Platform Mount [LP 1201-1]		
50.0	51.0	1	lucent	KS24019-L112A	1	1/2
	50.0	1	-	Side Arm Mount [SO 702-1]		

Table 2 - Non-Carrier Equipment To Be Conditionally Removed

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
101.0	101.0	3	rfs/celwave	APX16DWV-16DWVS-C w/ Mount Pipe	6	1-5/8
		3	andrew	ETT19VS12UB		
		3	ericsson	KRY 112 144/1		
		1	-	T-Arm Mount [TA 602-3]		

Table 3 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
132.0	132.0	3	cci antennas	TPA65R-BU8D_CCIV2 w/ Mount Pipe	6 4 2 2	1-1/4 3/4 3/8 2C
		3	ericsson	RRUS 4415 B25		
		3	ericsson	RRUS 4449 B5/B12		
		3	kaelus	DBC0111F2V62-1		
		1	raycap	DC6-48-60-18-8C-EV		
		1	raycap	DC6-48-60-18-8F		
		1	-	Side Arm Mount [SO 102-3]		
111.0	111.0	3	jma wireless	MX08FRO665-21 w/ Mount Pipe	1	1-1/2
		3	fujitsu	TA08025-B604		
		3	fujitsu	TA08025-B605		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-PK8-DSH		
93.0	94.0	3	commscope	NHH-65B-R2B	7	1-5/8
		3	commscope	NHHSS-65B-R2BT4		
		3	samsung telecommunications	MT6407-77A w/ Mount Pipe		
		2	antel	BXA-171063-12CF-EDIN-X w/ Mount Pipe		
		1	antel	BXA-171063-8BF-2 w/ Mount Pipe		
		6	rfs/celwave	FD9R6004/2C-3L		
		3	samsung telecommunications	CBRS RT4401-48A		
		3	samsung telecommunications	RF4439D-25A		
		3	samsung telecommunications	RF4440D-13A		
		2	raycap	RVZDC-6627-PF-48		
	93.0	3	-	13' Support Rail		
		3	-	Commscope BASMNT-SBS-1-2		
		3	-	VZWSMART-P40-278x072		
		3	-	VZWSMART-PLK6		
		1	-	VZWSMART-PLK7		
		1	-	Platform Mount [LP 1201-1]		
75.0	75.0	3	rfs/celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	1629353	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	1629413	CCISITES
4-TOWER MANUFACTURER DRAWINGS	1629384	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	2339268	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	2611098	CCISITES
4-POST-MODIFICATION INSPECTION	5287888	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	8173364	CCISITES
4-POST-MODIFICATION INSPECTION	8482047	CCISITES

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the reinforcing elements. These calculations are presented in Appendix C.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Morrison Hershfield should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
L1	133 - 128	Pole	TP14x14x0.375	Pole	4.6	Pass
L2	128 - 123	Pole	TP14x14x0.375	Pole	10.6	Pass
L3	123 - 118	Pole	TP22.75x22x0.1875	Pole	12.9	Pass
L4	118 - 113	Pole	TP23.5x22.75x0.1875	Pole	21.1	Pass
L5	113 - 108	Pole	TP24.251x23.5x0.1875	Pole	31.5	Pass
L6	108 - 103	Pole	TP25.001x24.251x0.1875	Pole	42.1	Pass
L7	103 - 98	Pole	TP25.751x25.001x0.1875	Pole	52.0	Pass
L8	98 - 93	Pole	TP26.501x25.751x0.1875	Pole	61.3	Pass
L9	93 - 88	Pole	TP27.251x26.501x0.1875	Pole	75.6	Pass
L10	88 - 85.75	Pole	TP28.114x27.251x0.1875	Pole	81.2	Pass
L11	85.75 - 80.75	Pole	TP27.964x27.214x0.25	Pole	60.8	Pass
L12	80.75 - 75.75	Pole	TP28.714x27.964x0.25	Pole	67.8	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
L13	75.75 - 70.75	Pole	TP29.465x28.714x0.25	Pole	74.5	Pass
L14	70.75 - 65.75	Pole	TP30.215x29.465x0.25	Pole	80.7	Pass
L15	65.75 - 60.75	Pole	TP30.965x30.215x0.25	Pole	86.5	Pass
L16	60.75 - 57.75	Pole	TP31.415x30.965x0.25	Pole	89.8	Pass
L17	57.75 - 57.5	Pole + Reinf.	TP31.453x31.415x0.4625	Reinf. 2 Tension Rupture	78.0	Pass
L18	57.5 - 52.5	Pole + Reinf.	TP32.203x31.453x0.4563	Reinf. 2 Tension Rupture	82.8	Pass
L19	52.5 - 47.5	Pole + Reinf.	TP32.953x32.203x0.45	Reinf. 2 Tension Rupture	87.4	Pass
L20	47.5 - 45	Pole + Reinf.	TP33.966x32.953x0.45	Reinf. 2 Tension Rupture	89.5	Pass
L21	45 - 40	Pole + Reinf.	TP33.578x32.828x0.4813	Reinf. 2 Tension Rupture	89.7	Pass
L22	40 - 35	Pole + Reinf.	TP34.329x33.578x0.4688	Reinf. 2 Tension Rupture	93.4	Pass
L23	35 - 30	Pole + Reinf.	TP35.079x34.329x0.4688	Reinf. 2 Tension Rupture	96.8	Pass
L24	30 - 26.25	Pole + Reinf.	TP35.642x35.079x0.4688	Reinf. 2 Tension Rupture	99.2	Pass
L25	26.25 - 26	Pole + Reinf.	TP35.679x35.642x0.5188	Reinf. 1 Tension Rupture	84.4	Pass
L26	26 - 21	Pole + Reinf.	TP36.429x35.679x0.5063	Reinf. 1 Tension Rupture	87.2	Pass
L27	21 - 16	Pole + Reinf.	TP37.179x36.429x0.5063	Reinf. 1 Tension Rupture	89.8	Pass
L28	16 - 11	Pole + Reinf.	TP37.93x37.179x0.4938	Reinf. 1 Tension Rupture	92.2	Pass
L29	11 - 6	Pole + Reinf.	TP38.68x37.93x0.4938	Reinf. 1 Tension Rupture	94.5	Pass
L30	6 - 1	Pole + Reinf.	TP39.43x38.68x0.4875	Reinf. 1 Tension Rupture	96.6	Pass
L31	1 - 0	Pole + Reinf.	TP39.58x39.43x0.4875	Reinf. 1 Tension Rupture	97.0	Pass
					Summary	
				Pole	89.8	Pass
				Reinforcement	99.2	Pass
				Overall	99.2	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Connection	123.0	46.9	Pass
1	Anchor Rods	0	78.8	Pass
1	Base Plate		53.1	Pass
1	Base Foundation (Structure)	0	79.5	Pass
1	Base Foundation (Soil Interaction)		48.4	Pass

Structure Rating (max from all components) =	99.2%*

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) *Rating per TIA-222-H, Section 15.5

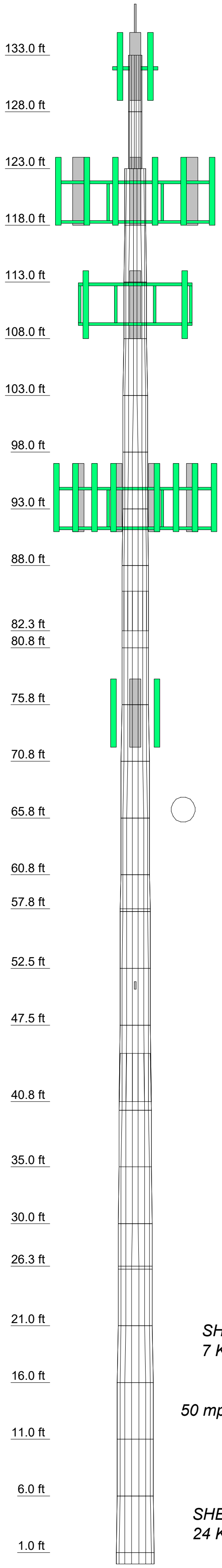
4.1) Recommendations

Once the equipment in Table 2 is removed, the tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.00	0	0.3750		14.0000	14.0000		0.3
2	5.00	0	0.3750		14.0000	14.0000	A500-42	0.3
3	5.00	18	0.1875		22.0000	22.7502		0.2
4	5.00	18	0.1875		22.7502	23.5004		0.2
5	5.00	18	0.1875		23.5004	24.2506		0.2
6	5.00	18	0.1875		24.2506	25.0007		0.2
7	5.00	18	0.1875		25.0007	25.7509	A607-60	0.3
8	5.00	18	0.1875		25.7509	26.5011		0.3
9	5.00	18	0.1875		26.5011	27.2513		0.3
10	5.75	18	0.1875	3.50	27.2513	28.1140		0.3
11	5.00	18	0.2500		27.2139	27.9641		0.4
12	5.00	18	0.2500		27.9642	28.7143		0.4
13	5.00	18	0.2500		28.7143	29.4646		0.4
14	5.00	18	0.2500		29.4646	30.2148		0.4
15	5.00	18	0.2500		30.2148	30.9651		0.4
16	3.00	18	0.2500		30.9651	[illegible]		0.3
17	0.25	18	[illegible]		[illegible]	[illegible]		0.0
18	5.00	18	0.4562		31.4527	32.2029		0.7
19	5.00	18	0.4500		32.2029	32.9532		0.7
20	6.75	18	0.4500	4.25	32.9532	33.9660		1.0
21	5.00	18	0.4813		32.8283	33.5785	A607-65	0.8
22	5.00	18	0.4688		33.578[illegible]	34.328[illegible]		0.8
23	5.00	18	0.4688		34.3287	35.0789		0.8
24	3.75	18	0.4688		35.0789	[illegible]		0.6
25	0.25	18	[illegible]		[illegible]	[illegible]		0.0
26	5.00	18	0.5062		35.6790	36.4292		0.9
27	5.00	18	0.5062		36.4292	37.1794		0.9
28	5.00	18	0.4938		37.1794	37.9296		1.0
29	5.00	18	0.4938		37.9296	38.6798		1.0
30	5.00	18	0.4875		38.6798	39.4300		1.0
31	1.00	18	0.4875		39.4300	39.5800		0.2
								15.4



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-42	42 ksi	58 ksi	A607-65	65 ksi	80 ksi
A607-60	60 ksi	75 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 118 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. CCI POLE RATING: 99.2%

ALL REACTIONS ARE FACTORED

AXIAL 52 K
SHEAR 7 K
MOMENT 648 kip-ft
TORQUE 0 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 37 K
SHEAR 24 K
MOMENT 2290 kip-ft
TORQUE 1 kip-ft
REACTIONS - 118 mph WIND

Morrison Hershfield
Consulting Engineers
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
Phone: (770) 379-8500
FAX: (770) 379-8501

Job: **CN11-646R2 / 2200039**			
Project: **876382 / Berlin / Laviana Orchard**			
Client: Crown Castle USA	Drawn by: KYR	App'd:	
Code: TIA-222-H	Date: 06/28/22	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Tower base elevation above sea level: 345.00 ft.
Basic wind speed of 118 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Maximum demand-capacity ratio is: 1.05.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	133.00-128.00	5.00	0.00	Round	14.0000	14.0000	0.3750		A500-42 (42 ksi)
L2	128.00-123.00	5.00	0.00	Round	14.0000	14.0000	0.3750		A500-42 (42 ksi)
L3	123.00-118.00	5.00	0.00	18	22.0000	22.7502	0.1875	0.7500	A607-60 (60 ksi)
L4	118.00-113.00	5.00	0.00	18	22.7502	23.5004	0.1875	0.7500	A607-60 (60 ksi)
L5	113.00-108.00	5.00	0.00	18	23.5004	24.2506	0.1875	0.7500	A607-60 (60 ksi)
L6	108.00-103.00	5.00	0.00	18	24.2506	25.0007	0.1875	0.7500	A607-60 (60 ksi)
L7	103.00-98.00	5.00	0.00	18	25.0007	25.7509	0.1875	0.7500	A607-60 (60 ksi)
L8	98.00-93.00	5.00	0.00	18	25.7509	26.5011	0.1875	0.7500	A607-60 (60 ksi)
L9	93.00-88.00	5.00	0.00	18	26.5011	27.2513	0.1875	0.7500	A607-60 (60 ksi)
L10	88.00-82.25	5.75	3.50	18	27.2513	28.1140	0.1875	0.7500	A607-60 (60 ksi)
L11	82.25-80.75	5.00	0.00	18	27.2139	27.9641	0.2500	1.0000	A607-65 (65 ksi)
L12	80.75-75.75	5.00	0.00	18	27.9641	28.7143	0.2500	1.0000	A607-65 (65 ksi)
L13	75.75-70.75	5.00	0.00	18	28.7143	29.4646	0.2500	1.0000	A607-65 (65 ksi)
L14	70.75-65.75	5.00	0.00	18	29.4646	30.2148	0.2500	1.0000	A607-65 (65 ksi)
L15	65.75-60.75	5.00	0.00	18	30.2148	30.9651	0.2500	1.0000	A607-65 (65 ksi)
L16	60.75-57.75	3.00	0.00	18	30.9651	31.4152	0.2500	1.0000	A607-65 (65 ksi)
L17	57.75-57.50	0.25	0.00	18	31.4152	31.4527	0.4625	1.8500	A607-65 (65 ksi)
L18	57.50-52.50	5.00	0.00	18	31.4527	32.2029	0.4562	1.8250	A607-65 (65 ksi)
L19	52.50-47.50	5.00	0.00	18	32.2029	32.9532	0.4500	1.8000	A607-65 (65 ksi)
L20	47.50-40.75	6.75	4.25	18	32.9532	33.9660	0.4500	1.8000	A607-65 (65 ksi)
L21	40.75-40.00	5.00	0.00	18	32.8283	33.5785	0.4813	1.9250	A607-65 (65 ksi)
L22	40.00-35.00	5.00	0.00	18	33.5785	34.3287	0.4688	1.8750	A607-65 (65 ksi)
L23	35.00-30.00	5.00	0.00	18	34.3287	35.0789	0.4688	1.8750	A607-65 (65 ksi)
L24	30.00-26.25	3.75	0.00	18	35.0789	35.6415	0.4688	1.8750	A607-65 (65 ksi)
L25	26.25-26.00	0.25	0.00	18	35.6415	35.6790	0.5188	2.0750	A607-65 (65 ksi)
L26	26.00-21.00	5.00	0.00	18	35.6790	36.4292	0.5062	2.0250	A607-65 (65 ksi)
L27	21.00-16.00	5.00	0.00	18	36.4292	37.1794	0.5062	2.0250	A607-65 (65 ksi)
L28	16.00-11.00	5.00	0.00	18	37.1794	37.9296	0.4938	1.9750	A607-65 (65 ksi)
L29	11.00-6.00	5.00	0.00	18	37.9296	38.6798	0.4938	1.9750	A607-65 (65 ksi)
L30	6.00-1.00	5.00	0.00	18	38.6798	39.4300	0.4875	1.9500	A607-65 (65 ksi)
L31	1.00-0.00	1.00		18	39.4300	39.5800	0.4875	1.9500	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	14.0000	16.0516	372.7602	4.8190	7.0000	53.2515	745.5204	8.0210	0.0000	0
	14.0000	16.0516	372.7602	4.8190	7.0000	53.2515	745.5204	8.0210	0.0000	0
L2	14.0000	16.0516	372.7602	4.8190	7.0000	53.2515	745.5204	8.0210	0.0000	0
	14.0000	16.0516	372.7602	4.8190	7.0000	53.2515	745.5204	8.0210	0.0000	0
L3	22.3105	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	23.0722	13.4276	863.6105	8.0098	11.5571	74.7256	1728.3574	6.7151	3.6740	19.595
L4	23.0722	13.4276	863.6105	8.0098	11.5571	74.7256	1728.3574	6.7151	3.6740	19.595
	23.8340	13.8741	952.6487	8.2761	11.9382	79.7984	1906.5509	6.9384	3.8061	20.299
L5	23.8340	13.8741	952.6487	8.2761	11.9382	79.7984	1906.5509	6.9384	3.8061	20.299
	24.5957	14.3205	1047.6055	8.5424	12.3193	85.0379	2096.5895	7.1616	3.9381	21.003
L6	24.5957	14.3205	1047.6055	8.5424	12.3193	85.0379	2096.5895	7.1616	3.9381	21.003
	25.3575	14.7670	1148.6716	8.8087	12.7004	90.4439	2298.8546	7.3849	4.0701	21.707
L7	25.3575	14.7670	1148.6716	8.8087	12.7004	90.4439	2298.8546	7.3849	4.0701	21.707
	26.1192	15.2134	1256.0373	9.0750	13.0815	96.0165	2513.7272	7.6082	4.2022	22.412
L8	26.1192	15.2134	1256.0373	9.0750	13.0815	96.0165	2513.7272	7.6082	4.2022	22.412
	26.8810	15.6599	1369.8931	9.3413	13.4626	101.7558	2741.5886	7.8314	4.3342	23.116
L9	26.8810	15.6599	1369.8931	9.3413	13.4626	101.7558	2741.5886	7.8314	4.3342	23.116
	27.6428	16.1063	1490.4294	9.6076	13.8437	107.6616	2982.8200	8.0547	4.4662	23.82
L10	27.6428	16.1063	1490.4294	9.6076	13.8437	107.6616	2982.8200	8.0547	4.4662	23.82
	28.5188	16.6198	1637.5523	9.9139	14.2819	114.6592	3277.2593	8.3115	4.6181	24.63
L11	28.1284	21.3958	1965.3102	9.5722	13.8246	142.1599	3933.2064	10.6999	4.3496	17.399
	28.3569	21.9911	2133.9640	9.8385	14.2058	150.2181	4270.7359	10.9977	4.4817	17.927
L12	28.3569	21.9911	2133.9640	9.8385	14.2058	150.2181	4270.7359	10.9977	4.4817	17.927
	29.1187	22.5865	2312.0005	10.1048	14.5869	158.4986	4627.0433	11.2954	4.6137	18.455
L13	29.1187	22.5865	2312.0005	10.1048	14.5869	158.4986	4627.0433	11.2954	4.6137	18.455
	29.8806	23.1818	2499.6739	10.3712	14.9680	167.0011	5002.6370	11.5931	4.7458	18.983
L14	29.8806	23.1818	2499.6739	10.3712	14.9680	167.0011	5002.6370	11.5931	4.7458	18.983
	30.6424	23.7771	2697.2381	10.6375	15.3491	175.7258	5398.0253	11.8908	4.8778	19.511
L15	30.6424	23.7771	2697.2381	10.6375	15.3491	175.7258	5398.0253	11.8908	4.8778	19.511
	31.4042	24.3724	2904.9471	10.9038	15.7302	184.6727	5813.7166	12.1885	5.0098	20.039
L16	31.4042	24.3724	2904.9471	10.9038	15.7302	184.6727	5813.7166	12.1885	5.0098	20.039
	31.8613	24.7296	3034.5476	11.0636	15.9589	190.1474	6073.0882	12.3671	5.0891	20.356
L17	31.8285	45.4378	5499.8589	10.9882	15.9589	344.6260	11006.9546	22.7232	4.7151	10.195
	31.8666	45.4928	5519.8791	11.0015	15.9780	345.4680	11047.0214	22.7507	4.7217	10.209
L18	31.8675	44.8871	5448.5814	11.0037	15.9780	341.0057	10904.3321	22.4478	4.7327	10.373
	32.6293	45.9736	5853.8660	11.2701	16.3591	357.8355	11715.4346	22.9912	4.8647	10.662
L19	32.6303	45.3527	5777.0867	11.2723	16.3591	353.1422	11561.7750	22.6807	4.8757	10.835
	33.3921	46.4243	6196.3290	11.5386	16.7402	370.1463	12400.8114	23.2166	5.0078	11.128
L20	33.3921	46.4243	6196.3290	11.5386	16.7402	370.1463	12400.8114	23.2166	5.0078	11.128
	34.4206	47.8709	6793.8105	11.8982	17.2547	393.7362	13596.5606	23.9400	5.1860	11.524
L21	33.9080	49.4097	6531.5930	11.4832	16.6768	391.6580	13071.7804	24.7096	4.9308	10.246
	34.0222	50.5556	6996.6536	11.7495	17.0579	410.1715	14002.5136	25.2826	5.0628	10.52
L22	34.0242	49.2611	6822.6467	11.7540	17.0579	399.9706	13654.2709	24.6352	5.0848	10.848
	34.7859	50.3772	7296.9892	12.0203	17.4390	418.4301	14603.5800	25.1934	5.2168	11.129
L23	34.7859	50.3772	7296.9892	12.0203	17.4390	418.4301	14603.5800	25.1934	5.2168	11.129
	35.5477	51.4934	7792.8231	12.2866	17.8201	437.3061	15595.9002	25.7516	5.3489	11.411
L24	35.5477	51.4934	7792.8231	12.2866	17.8201	437.3061	15595.9002	25.7516	5.3489	11.411
	36.1190	52.3305	8179.0886	12.4863	18.1059	451.7365	16368.9395	26.1702	5.4479	11.622
L25	36.1113	57.8301	9012.9779	12.4686	18.1059	497.7927	18037.8153	28.9205	5.3599	10.332
	36.1494	57.8918	9041.8851	12.4819	18.1249	498.8643	18095.667	28.9514	5.3665	10.345

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L26	36.1513	56.5169	8833.4229	12.4863	18.1249	487.3629	17678.4686	28.2638	5.3885	10.644
	36.9131	57.7224	9410.7799	12.7526	18.5060	508.5249	18833.9427	28.8667	5.5205	10.905
L27	36.9131	57.7224	9410.7799	12.7526	18.5060	508.5249	18833.9427	28.8667	5.5205	10.905
	37.6749	58.9278	10012.7617	13.0190	18.8871	530.1367	20038.6985	29.4695	5.6526	11.166
L28	37.6768	57.4924	9775.5222	13.0234	18.8871	517.5758	19563.9072	28.7516	5.6746	11.493
	38.4385	58.6680	10387.5715	13.2897	19.2682	539.1036	20788.8112	29.3396	5.8066	11.76
L29	38.4385	58.6680	10387.5715	13.2897	19.2682	539.1036	20788.8112	29.3396	5.8066	11.76
	39.2003	59.8437	11024.6491	13.5560	19.6493	561.0701	22063.8048	29.9275	5.9386	12.028
L30	39.2013	59.0959	10890.4423	13.5583	19.6493	554.2400	21795.2145	29.5535	5.9496	12.204
	39.9630	60.2566	11544.8744	13.8246	20.0304	576.3670	23104.9399	30.1340	6.0817	12.475
L31	39.9630	60.2566	11544.8744	13.8246	20.0304	576.3670	23104.9399	30.1340	6.0817	12.475
	40.1154	60.4888	11678.8297	13.8778	20.1066	580.8444	23373.0268	30.2501	6.1081	12.529

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 133.00-128.00				1	1	1			
L2 128.00-123.00				1	1	1			
L3 123.00-118.00				1	1	1			
L4 118.00-113.00				1	1	1			
L5 113.00-108.00				1	1	1			
L6 108.00-103.00				1	1	1			
L7 103.00-98.00				1	1	1			
L8 98.00-93.00				1	1	1			
L9 93.00-88.00				1	1	1			
L10 88.00-82.25				1	1	1			
L11 82.25-80.75				1	1	1			
L12 80.75-75.75				1	1	1			
L13 75.75-70.75				1	1	1			
L14 70.75-65.75				1	1	1			
L15 65.75-60.75				1	1	1			
L16 60.75-57.75				1	1	1			
L17 57.75-57.50				1	1	0.94611			
L18 57.50-52.50				1	1	0.949166			
L19 52.50-47.50				1	1	0.952774			

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L20 47.50-40.75				1	1	0.948243			
L21 40.75-40.00				1	1	0.949567			
L22 40.00-35.00				1	1	0.966223			
L23 35.00-30.00				1	1	0.958285			
L24 30.00-26.25				1	1	0.952553			
L25 26.25-26.00				1	1	0.942598			
L26 26.00-21.00				1	1	0.956967			
L27 21.00-16.00				1	1	0.948756			
L28 16.00-11.00				1	1	0.964371			
L29 11.00-6.00				1	1	0.956616			
L30 6.00-1.00				1	1	0.961174			
L31 1.00-0.00				1	1	0.9597			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Climbing Pegs	A	No	Surface Ar (CaAa)	133.00 - 8.00	1	1	-0.050 0.050	0.7050		1.80
AVA7-50(1-5/8) ******	A	No	Surface Ar (CaAa)	75.00 - 8.00	2	2	0.420 0.450	2.0100		0.70
LDF4-50A(1/2) ******	B	No	Surface Ar (CaAa)	50.00 - 6.00	1	1	0.470 0.470	0.6250		0.15
FP 6.125 x 1.25 Reinforcement	A	No	Surface Af (CaAa)	29.75 - 0.00	1	1	0.125 0.125	6.1250	14.7500	0.00
FP 6.125 x 1.25 Reinforcement	B	No	Surface Af (CaAa)	29.75 - 0.00	1	1	0.125 0.125	6.1250	14.7500	0.00
FP 6.125 x 1.25 Reinforcement ***	C	No	Surface Af (CaAa)	29.75 - 0.00	1	1	0.125 0.125	6.1250	14.7500	0.00
FP 4.875 x 1.25 Reinforcement	A	No	Surface Af (CaAa)	59.50 - 29.75	1	1	0.125 0.125	4.8750	12.2500	0.00
FP 4.875 x 1.25 Reinforcement	B	No	Surface Af (CaAa)	59.50 - 29.75	1	1	0.125 0.125	4.8750	12.2500	0.00
FP 4.875 x 1.25 Reinforcement ******	C	No	Surface Af (CaAa)	59.50 - 29.75	1	1	0.125 0.125	4.8750	12.2500	0.00

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
******									
LDF6-50A(1-1/4)	B	No	No	Inside Pole	132.00 - 12.00	6	No Ice	0.00	0.60
							1/2" Ice	0.00	0.60
							1" Ice	0.00	0.60
WR-VG86ST-BRD(3/4)	B	No	No	Inside Pole	132.00 - 12.00	4	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
FB-L98B-034-XXX(3/8)	B	No	No	Inside Pole	132.00 - 12.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
CONDUIT(2)	B	No	No	Inside Pole	132.00 - 12.00	2	No Ice	0.00	0.36
							1/2" Ice	0.00	0.36
							1" Ice	0.00	0.36
******									
***									
HB158-21U6S24-xxM_TMO(1-5/8)	B	No	No	Inside Pole	120.00 - 6.00	3	No Ice	0.00	2.50
							1/2" Ice	0.00	2.50
							1" Ice	0.00	2.50
******									
CU12PSM9P6XXX (1-1/2)	A	No	No	Inside Pole	111.00 - 6.00	1	No Ice	0.00	2.35
							1/2" Ice	0.00	2.35
							1" Ice	0.00	2.35
******									
******									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	93.00 - 8.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
***									
HB158-21U6S12-XXXM-01(1-5/8)	A	No	No	Inside Pole	93.00 - 8.00	1	No Ice	0.00	1.90
							1/2" Ice	0.00	1.90
							1" Ice	0.00	1.90
******									
AVA7-50(1-5/8)	A	No	No	Inside Pole	75.00 - 8.00	4	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
******									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	133.00-128.00	A	0.000	0.000	0.352	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.00
L2	128.00-123.00	A	0.000	0.000	0.352	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.00
L3	123.00-118.00	A	0.000	0.000	0.352	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.05
		C	0.000	0.000	0.000	0.000	0.00
L4	118.00-113.00	A	0.000	0.000	0.352	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L5	113.00-108.00	A	0.000	0.000	0.352	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L6	108.00-103.00	A	0.000	0.000	0.352	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L7	103.00-98.00	A	0.000	0.000	0.352	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.07

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	0.000	0.00
L8	98.00-93.00	A	0.000	0.000	0.352	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L9	93.00-88.00	A	0.000	0.000	0.352	0.000	0.05
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L10	88.00-82.25	A	0.000	0.000	0.405	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.00
L11	82.25-80.75	A	0.000	0.000	0.106	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L12	80.75-75.75	A	0.000	0.000	0.352	0.000	0.05
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L13	75.75-70.75	A	0.000	0.000	2.061	0.000	0.07
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L14	70.75-65.75	A	0.000	0.000	2.362	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L15	65.75-60.75	A	0.000	0.000	2.362	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L16	60.75-57.75	A	0.000	0.000	2.839	0.000	0.05
		B	0.000	0.000	1.422	0.000	0.04
		C	0.000	0.000	1.422	0.000	0.00
L17	57.75-57.50	A	0.000	0.000	0.321	0.000	0.00
		B	0.000	0.000	0.203	0.000	0.00
		C	0.000	0.000	0.203	0.000	0.00
L18	57.50-52.50	A	0.000	0.000	6.425	0.000	0.08
		B	0.000	0.000	4.063	0.000	0.07
		C	0.000	0.000	4.063	0.000	0.00
L19	52.50-47.50	A	0.000	0.000	6.425	0.000	0.08
		B	0.000	0.000	4.219	0.000	0.07
		C	0.000	0.000	4.063	0.000	0.00
L20	47.50-40.75	A	0.000	0.000	8.674	0.000	0.10
		B	0.000	0.000	5.906	0.000	0.10
		C	0.000	0.000	5.484	0.000	0.00
L21	40.75-40.00	A	0.000	0.000	0.964	0.000	0.01
		B	0.000	0.000	0.656	0.000	0.01
		C	0.000	0.000	0.609	0.000	0.00
L22	40.00-35.00	A	0.000	0.000	6.425	0.000	0.08
		B	0.000	0.000	4.375	0.000	0.07
		C	0.000	0.000	4.063	0.000	0.00
L23	35.00-30.00	A	0.000	0.000	6.425	0.000	0.08
		B	0.000	0.000	4.375	0.000	0.07
		C	0.000	0.000	4.063	0.000	0.00
L24	30.00-26.25	A	0.000	0.000	5.548	0.000	0.06
		B	0.000	0.000	4.010	0.000	0.05
		C	0.000	0.000	3.776	0.000	0.00
L25	26.25-26.00	A	0.000	0.000	0.373	0.000	0.00
		B	0.000	0.000	0.271	0.000	0.00
		C	0.000	0.000	0.255	0.000	0.00
L26	26.00-21.00	A	0.000	0.000	7.467	0.000	0.08
		B	0.000	0.000	5.417	0.000	0.07
		C	0.000	0.000	5.104	0.000	0.00
L27	21.00-16.00	A	0.000	0.000	7.467	0.000	0.08
		B	0.000	0.000	5.417	0.000	0.07
		C	0.000	0.000	5.104	0.000	0.00
L28	16.00-11.00	A	0.000	0.000	7.467	0.000	0.08
		B	0.000	0.000	5.417	0.000	0.07
		C	0.000	0.000	5.104	0.000	0.00
L29	11.00-6.00	A	0.000	0.000	6.522	0.000	0.05
		B	0.000	0.000	5.417	0.000	0.04
		C	0.000	0.000	5.104	0.000	0.00
L30	6.00-1.00	A	0.000	0.000	5.104	0.000	0.00
		B	0.000	0.000	5.104	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
		C	0.000	0.000	5.104	0.000	0.00
L31	1.00-0.00	A	0.000	0.000	1.021	0.000	0.00
		B	0.000	0.000	1.021	0.000	0.00
		C	0.000	0.000	1.021	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L1	133.00-128.00	A	0.975	0.000	0.000	1.328	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.00
L2	128.00-123.00	A	0.971	0.000	0.000	1.324	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.00
L3	123.00-118.00	A	0.968	0.000	0.000	1.320	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.05
		C		0.000	0.000	0.000	0.000	0.00
L4	118.00-113.00	A	0.963	0.000	0.000	1.316	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L5	113.00-108.00	A	0.959	0.000	0.000	1.312	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L6	108.00-103.00	A	0.955	0.000	0.000	1.307	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L7	103.00-98.00	A	0.950	0.000	0.000	1.303	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L8	98.00-93.00	A	0.945	0.000	0.000	1.298	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L9	93.00-88.00	A	0.940	0.000	0.000	1.293	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L10	88.00-82.25	A	0.934	0.000	0.000	1.480	0.000	0.07
		B		0.000	0.000	0.000	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.00
L11	82.25-80.75	A	0.930	0.000	0.000	0.386	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L12	80.75-75.75	A	0.927	0.000	0.000	1.279	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L13	75.75-70.75	A	0.921	0.000	0.000	4.387	0.000	0.10
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L14	70.75-65.75	A	0.914	0.000	0.000	4.922	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L15	65.75-60.75	A	0.907	0.000	0.000	4.906	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L16	60.75-57.75	A	0.901	0.000	0.000	4.673	0.000	0.08
		B		0.000	0.000	1.737	0.000	0.05
		C		0.000	0.000	1.737	0.000	0.01
L17	57.75-57.50	A	0.899	0.000	0.000	0.492	0.000	0.01
		B		0.000	0.000	0.248	0.000	0.00
		C		0.000	0.000	0.248	0.000	0.00
L18	57.50-52.50	A	0.895	0.000	0.000	9.835	0.000	0.14
		B		0.000	0.000	4.957	0.000	0.10
		C		0.000	0.000	4.957	0.000	0.03
L19	52.50-47.50	A	0.886	0.000	0.000	9.807	0.000	0.14
		B		0.000	0.000	5.548	0.000	0.10

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	4.949	0.000	0.03
L20	47.50-40.75	A	0.875	0.000	0.000	13.191	0.000	0.18
		B		0.000	0.000	8.269	0.000	0.14
		C		0.000	0.000	6.666	0.000	0.04
L21	40.75-40.00	A	0.867	0.000	0.000	1.466	0.000	0.02
		B		0.000	0.000	0.919	0.000	0.02
		C		0.000	0.000	0.741	0.000	0.00
L22	40.00-35.00	A	0.861	0.000	0.000	9.725	0.000	0.13
		B		0.000	0.000	6.097	0.000	0.11
		C		0.000	0.000	4.923	0.000	0.03
L23	35.00-30.00	A	0.849	0.000	0.000	9.686	0.000	0.13
		B		0.000	0.000	6.072	0.000	0.11
		C		0.000	0.000	4.911	0.000	0.03
L24	30.00-26.25	A	0.837	0.000	0.000	7.964	0.000	0.10
		B		0.000	0.000	5.265	0.000	0.08
		C		0.000	0.000	4.403	0.000	0.02
L25	26.25-26.00	A	0.830	0.000	0.000	0.533	0.000	0.01
		B		0.000	0.000	0.354	0.000	0.01
		C		0.000	0.000	0.297	0.000	0.00
L26	26.00-21.00	A	0.822	0.000	0.000	10.639	0.000	0.13
		B		0.000	0.000	7.060	0.000	0.11
		C		0.000	0.000	5.926	0.000	0.03
L27	21.00-16.00	A	0.802	0.000	0.000	10.576	0.000	0.13
		B		0.000	0.000	7.021	0.000	0.11
		C		0.000	0.000	5.906	0.000	0.03
L28	16.00-11.00	A	0.777	0.000	0.000	10.495	0.000	0.13
		B		0.000	0.000	6.971	0.000	0.10
		C		0.000	0.000	5.881	0.000	0.03
L29	11.00-6.00	A	0.742	0.000	0.000	8.567	0.000	0.09
		B		0.000	0.000	6.901	0.000	0.07
		C		0.000	0.000	5.846	0.000	0.03
L30	6.00-1.00	A	0.679	0.000	0.000	5.783	0.000	0.02
		B		0.000	0.000	5.783	0.000	0.02
		C		0.000	0.000	5.783	0.000	0.02
L31	1.00-0.00	A	0.559	0.000	0.000	1.133	0.000	0.00
		B		0.000	0.000	1.133	0.000	0.00
		C		0.000	0.000	1.133	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	133.00-128.00	-0.5826	-0.3364	-0.9088	-0.5247
L2	128.00-123.00	-0.5826	-0.3364	-0.9069	-0.5236
L3	123.00-118.00	-0.4856	-0.2804	-0.9677	-0.5587
L4	118.00-113.00	-0.4859	-0.2805	-0.9695	-0.5597
L5	113.00-108.00	-0.4861	-0.2807	-0.9710	-0.5606
L6	108.00-103.00	-0.4864	-0.2808	-0.9721	-0.5612
L7	103.00-98.00	-0.4866	-0.2809	-0.9728	-0.5617
L8	98.00-93.00	-0.4868	-0.2811	-0.9732	-0.5619
L9	93.00-88.00	-0.4870	-0.2812	-0.9732	-0.5619
L10	88.00-82.25	-0.4872	-0.2813	-0.9728	-0.5617
L11	82.25-80.75	-0.4874	-0.2814	-0.9740	-0.5623
L12	80.75-75.75	-0.4875	-0.2815	-0.9706	-0.5604
L13	75.75-70.75	-0.7395	-2.6278	-1.0409	-2.6032
L14	70.75-65.75	-0.7786	-2.9744	-1.0550	-2.8820
L15	65.75-60.75	-0.7817	-2.9849	-1.0599	-2.8987
L16	60.75-57.75	-0.4921	-1.8786	-0.7807	-2.1373
L17	57.75-57.50	-0.3906	-1.4908	-0.6585	-1.8036
L18	57.50-52.50	-0.3933	-1.5009	-0.6618	-1.8139
L19	52.50-47.50	-0.3015	-1.4633	-0.4340	-1.6946
L20	47.50-40.75	-0.2098	-1.4284	-0.2124	-1.5813
L21	40.75-40.00	-0.2100	-1.4299	-0.2127	-1.5832
L22	40.00-35.00	-0.2115	-1.4396	-0.2138	-1.5903
L23	35.00-30.00	-0.2139	-1.4563	-0.2160	-1.6056

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L24	30.00-26.25	-0.1941	-1.3211	-0.2036	-1.5123
L25	26.25-26.00	-0.1936	-1.3180	-0.2035	-1.5108
L26	26.00-21.00	-0.1948	-1.3262	-0.2045	-1.5175
L27	21.00-16.00	-0.1971	-1.3417	-0.2063	-1.5293
L28	16.00-11.00	-0.1993	-1.3569	-0.2079	-1.5390
L29	11.00-6.00	-0.0484	-0.8092	0.0400	-0.8958
L30	6.00-1.00	0.0000	0.0000	0.0000	0.0000
L31	1.00-0.00	0.0000	0.0000	0.0000	0.0000

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	Climbing Pegs	128.00 - 133.00	1.0000	1.0000
L2	1	Climbing Pegs	123.00 - 128.00	1.0000	1.0000
L3	1	Climbing Pegs	118.00 - 123.00	1.0000	1.0000
L4	1	Climbing Pegs	113.00 - 118.00	1.0000	1.0000
L5	1	Climbing Pegs	108.00 - 113.00	1.0000	1.0000
L6	1	Climbing Pegs	103.00 - 108.00	1.0000	1.0000
L7	1	Climbing Pegs	98.00 - 103.00	1.0000	1.0000
L8	1	Climbing Pegs	93.00 - 98.00	1.0000	1.0000
L9	1	Climbing Pegs	88.00 - 93.00	1.0000	1.0000
L10	1	Climbing Pegs	82.25 - 88.00	1.0000	1.0000
L11	1	Climbing Pegs	80.75 - 82.25	1.0000	1.0000
L12	1	Climbing Pegs	75.75 - 80.75	1.0000	1.0000
L13	1	Climbing Pegs	70.75 - 75.75	1.0000	1.0000
L13	24	AVA7-50(1-5/8)	70.75 - 75.00	1.0000	1.0000
L14	1	Climbing Pegs	65.75 - 70.75	1.0000	1.0000
L14	24	AVA7-50(1-5/8)	65.75 - 70.75	1.0000	1.0000
L15	1	Climbing Pegs	60.75 - 65.75	1.0000	1.0000
L15	24	AVA7-50(1-5/8)	60.75 - 65.75	1.0000	1.0000
L16	1	Climbing Pegs	57.75 - 60.75	1.0000	1.0000
L16	24	AVA7-50(1-5/8)	57.75 - 60.75	1.0000	1.0000
L16	32	FP 4.875 x 1.25 Reinforcement	57.75 - 59.50	1.0000	1.0000
L16	33	FP 4.875 x 1.25 Reinforcement	57.75 - 59.50	1.0000	1.0000
L16	34	FP 4.875 x 1.25 Reinforcement	57.75 - 59.50	1.0000	1.0000
L17	1	Climbing Pegs	57.50 - 57.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L17	24	AVA7-50(1-5/8)	57.50 - 57.75	1.0000	1.0000
L17	32	FP 4.875 x 1.25 Reinforcement	57.50 - 57.75	1.0000	1.0000
L17	33	FP 4.875 x 1.25 Reinforcement	57.50 - 57.75	1.0000	1.0000
L17	34	FP 4.875 x 1.25 Reinforcement	57.50 - 57.75	1.0000	1.0000
L18	1	Climbing Pegs	52.50 - 57.50	1.0000	1.0000
L18	24	AVA7-50(1-5/8)	52.50 - 57.50	1.0000	1.0000
L18	32	FP 4.875 x 1.25 Reinforcement	52.50 - 57.50	1.0000	1.0000
L18	33	FP 4.875 x 1.25 Reinforcement	52.50 - 57.50	1.0000	1.0000
L18	34	FP 4.875 x 1.25 Reinforcement	52.50 - 57.50	1.0000	1.0000
L19	1	Climbing Pegs	47.50 - 52.50	1.0000	1.0000
L19	24	AVA7-50(1-5/8)	47.50 - 52.50	1.0000	1.0000
L19	26	LDF4-50A(1/2)	47.50 - 50.00	1.0000	1.0000
L19	32	FP 4.875 x 1.25 Reinforcement	47.50 - 52.50	1.0000	1.0000
L19	33	FP 4.875 x 1.25 Reinforcement	47.50 - 52.50	1.0000	1.0000
L19	34	FP 4.875 x 1.25 Reinforcement	47.50 - 52.50	1.0000	1.0000
L20	1	Climbing Pegs	40.75 - 47.50	1.0000	1.0000
L20	24	AVA7-50(1-5/8)	40.75 - 47.50	1.0000	1.0000
L20	26	LDF4-50A(1/2)	40.75 - 47.50	1.0000	1.0000
L20	32	FP 4.875 x 1.25 Reinforcement	40.75 - 47.50	1.0000	1.0000
L20	33	FP 4.875 x 1.25 Reinforcement	40.75 - 47.50	1.0000	1.0000
L20	34	FP 4.875 x 1.25 Reinforcement	40.75 - 47.50	1.0000	1.0000
L21	1	Climbing Pegs	40.00 - 40.75	1.0000	1.0000
L21	24	AVA7-50(1-5/8)	40.00 - 40.75	1.0000	1.0000
L21	26	LDF4-50A(1/2)	40.00 - 40.75	1.0000	1.0000
L21	32	FP 4.875 x 1.25 Reinforcement	40.00 - 40.75	1.0000	1.0000
L21	33	FP 4.875 x 1.25 Reinforcement	40.00 - 40.75	1.0000	1.0000
L21	34	FP 4.875 x 1.25 Reinforcement	40.00 - 40.75	1.0000	1.0000
L22	1	Climbing Pegs	35.00 - 40.00	1.0000	1.0000
L22	24	AVA7-50(1-5/8)	35.00 - 40.00	1.0000	1.0000
L22	26	LDF4-50A(1/2)	35.00 - 40.00	1.0000	1.0000
L22	32	FP 4.875 x 1.25 Reinforcement	35.00 - 40.00	1.0000	1.0000
L22	33	FP 4.875 x 1.25 Reinforcement	35.00 - 40.00	1.0000	1.0000
L22	34	FP 4.875 x 1.25 Reinforcement	35.00 - 40.00	1.0000	1.0000
L23	1	Climbing Pegs	30.00 - 35.00	1.0000	1.0000
L23	24	AVA7-50(1-5/8)	30.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			35.00		
L23	26	LDF4-50A(1/2)	30.00 - 35.00	1.0000	1.0000
L23	32	FP 4.875 x 1.25 Reinforcement	30.00 - 35.00	1.0000	1.0000
L23	33	FP 4.875 x 1.25 Reinforcement	30.00 - 35.00	1.0000	1.0000
L23	34	FP 4.875 x 1.25 Reinforcement	30.00 - 35.00	1.0000	1.0000
L24	1	Climbing Pegs	26.25 - 30.00	1.0000	1.0000
L24	24	AVA7-50(1-5/8)	26.25 - 30.00	1.0000	1.0000
L24	26	LDF4-50A(1/2)	26.25 - 30.00	1.0000	1.0000
L24	28	FP 6.125 x 1.25 Reinforcement	26.25 - 29.75	1.0000	1.0000
L24	29	FP 6.125 x 1.25 Reinforcement	26.25 - 29.75	1.0000	1.0000
L24	30	FP 6.125 x 1.25 Reinforcement	26.25 - 29.75	1.0000	1.0000
L24	32	FP 4.875 x 1.25 Reinforcement	29.75 - 30.00	1.0000	1.0000
L24	33	FP 4.875 x 1.25 Reinforcement	29.75 - 30.00	1.0000	1.0000
L24	34	FP 4.875 x 1.25 Reinforcement	29.75 - 30.00	1.0000	1.0000
L25	1	Climbing Pegs	26.00 - 26.25	1.0000	1.0000
L25	24	AVA7-50(1-5/8)	26.00 - 26.25	1.0000	1.0000
L25	26	LDF4-50A(1/2)	26.00 - 26.25	1.0000	1.0000
L25	28	FP 6.125 x 1.25 Reinforcement	26.00 - 26.25	1.0000	1.0000
L25	29	FP 6.125 x 1.25 Reinforcement	26.00 - 26.25	1.0000	1.0000
L25	30	FP 6.125 x 1.25 Reinforcement	26.00 - 26.25	1.0000	1.0000
L26	1	Climbing Pegs	21.00 - 26.00	1.0000	1.0000
L26	24	AVA7-50(1-5/8)	21.00 - 26.00	1.0000	1.0000
L26	26	LDF4-50A(1/2)	21.00 - 26.00	1.0000	1.0000
L26	28	FP 6.125 x 1.25 Reinforcement	21.00 - 26.00	1.0000	1.0000
L26	29	FP 6.125 x 1.25 Reinforcement	21.00 - 26.00	1.0000	1.0000
L26	30	FP 6.125 x 1.25 Reinforcement	21.00 - 26.00	1.0000	1.0000
L27	1	Climbing Pegs	16.00 - 21.00	1.0000	1.0000
L27	24	AVA7-50(1-5/8)	16.00 - 21.00	1.0000	1.0000
L27	26	LDF4-50A(1/2)	16.00 - 21.00	1.0000	1.0000
L27	28	FP 6.125 x 1.25 Reinforcement	16.00 - 21.00	1.0000	1.0000
L27	29	FP 6.125 x 1.25 Reinforcement	16.00 - 21.00	1.0000	1.0000
L27	30	FP 6.125 x 1.25 Reinforcement	16.00 - 21.00	1.0000	1.0000
L28	1	Climbing Pegs	11.00 - 16.00	1.0000	1.0000
L28	24	AVA7-50(1-5/8)	11.00 - 16.00	1.0000	1.0000
L28	26	LDF4-50A(1/2)	11.00 - 16.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L28	28	FP 6.125 x 1.25 Reinforcement	11.00 - 16.00	1.0000	1.0000
L28	29	FP 6.125 x 1.25 Reinforcement	11.00 - 16.00	1.0000	1.0000
L28	30	FP 6.125 x 1.25 Reinforcement	11.00 - 16.00	1.0000	1.0000
L29	1	Climbing Pegs	8.00 - 11.00	1.0000	1.0000
L29	24	AVA7-50(1-5/8)	8.00 - 11.00	1.0000	1.0000
L29	26	LDF4-50A(1/2)	6.00 - 11.00	1.0000	1.0000
L29	28	FP 6.125 x 1.25 Reinforcement	6.00 - 11.00	1.0000	1.0000
L29	29	FP 6.125 x 1.25 Reinforcement	6.00 - 11.00	1.0000	1.0000
L29	30	FP 6.125 x 1.25 Reinforcement	6.00 - 11.00	1.0000	1.0000
L30	28	FP 6.125 x 1.25 Reinforcement	1.00 - 6.00	1.0000	1.0000
L30	29	FP 6.125 x 1.25 Reinforcement	1.00 - 6.00	1.0000	1.0000
L30	30	FP 6.125 x 1.25 Reinforcement	1.00 - 6.00	1.0000	1.0000
L31	28	FP 6.125 x 1.25 Reinforcement	0.00 - 1.00	1.0000	1.0000
L31	29	FP 6.125 x 1.25 Reinforcement	0.00 - 1.00	1.0000	1.0000
L31	30	FP 6.125 x 1.25 Reinforcement	0.00 - 1.00	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L16	32	FP 4.875 x 1.25 Reinforcement	57.75 - 59.50	Auto	0.0000
L16	33	FP 4.875 x 1.25 Reinforcement	57.75 - 59.50	Auto	0.0000
L16	34	FP 4.875 x 1.25 Reinforcement	57.75 - 59.50	Auto	0.0000
L17	32	FP 4.875 x 1.25 Reinforcement	57.50 - 57.75	Auto	0.0321
L17	33	FP 4.875 x 1.25 Reinforcement	57.50 - 57.75	Auto	0.0321
L17	34	FP 4.875 x 1.25 Reinforcement	57.50 - 57.75	Auto	0.0321
L18	32	FP 4.875 x 1.25 Reinforcement	52.50 - 57.50	Auto	0.0157
L18	33	FP 4.875 x 1.25 Reinforcement	52.50 - 57.50	Auto	0.0157
L18	34	FP 4.875 x 1.25 Reinforcement	52.50 - 57.50	Auto	0.0157
L19	32	FP 4.875 x 1.25 Reinforcement	47.50 - 52.50	Auto	0.0000
L19	33	FP 4.875 x 1.25 Reinforcement	47.50 - 52.50	Auto	0.0000
L19	34	FP 4.875 x 1.25 Reinforcement	47.50 - 52.50	Auto	0.0000
L20	32	FP 4.875 x 1.25 Reinforcement	40.75 - 47.50	Auto	0.0000
L20	33	FP 4.875 x 1.25 Reinforcement	40.75 - 47.50	Auto	0.0000
L20	34	FP 4.875 x 1.25 Reinforcement	40.75 - 47.50	Auto	0.0000
L21	32	FP 4.875 x 1.25 Reinforcement	40.00 - 40.75	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L21	33	FP 4.875 x 1.25 Reinforcement	40.00 - 40.75	Auto	0.0000
L21	34	FP 4.875 x 1.25 Reinforcement	40.00 - 40.75	Auto	0.0000
L22	32	FP 4.875 x 1.25 Reinforcement	35.00 - 40.00	Auto	0.0000
L22	33	FP 4.875 x 1.25 Reinforcement	35.00 - 40.00	Auto	0.0000
L22	34	FP 4.875 x 1.25 Reinforcement	35.00 - 40.00	Auto	0.0000
L23	32	FP 4.875 x 1.25 Reinforcement	30.00 - 35.00	Auto	0.0000
L23	33	FP 4.875 x 1.25 Reinforcement	30.00 - 35.00	Auto	0.0000
L23	34	FP 4.875 x 1.25 Reinforcement	30.00 - 35.00	Auto	0.0000
L24	28	FP 6.125 x 1.25 Reinforcement	26.25 - 29.75	Auto	0.1181
L24	29	FP 6.125 x 1.25 Reinforcement	26.25 - 29.75	Auto	0.1181
L24	30	FP 6.125 x 1.25 Reinforcement	26.25 - 29.75	Auto	0.1181
L24	32	FP 4.875 x 1.25 Reinforcement	29.75 - 30.00	Auto	0.0000
L24	33	FP 4.875 x 1.25 Reinforcement	29.75 - 30.00	Auto	0.0000
L24	34	FP 4.875 x 1.25 Reinforcement	29.75 - 30.00	Auto	0.0000
L25	28	FP 6.125 x 1.25 Reinforcement	26.00 - 26.25	Auto	0.1244
L25	29	FP 6.125 x 1.25 Reinforcement	26.00 - 26.25	Auto	0.1244
L25	30	FP 6.125 x 1.25 Reinforcement	26.00 - 26.25	Auto	0.1244
L26	28	FP 6.125 x 1.25 Reinforcement	21.00 - 26.00	Auto	0.1095
L26	29	FP 6.125 x 1.25 Reinforcement	21.00 - 26.00	Auto	0.1095
L26	30	FP 6.125 x 1.25 Reinforcement	21.00 - 26.00	Auto	0.1095
L27	28	FP 6.125 x 1.25 Reinforcement	16.00 - 21.00	Auto	0.0879
L27	29	FP 6.125 x 1.25 Reinforcement	16.00 - 21.00	Auto	0.0879
L27	30	FP 6.125 x 1.25 Reinforcement	16.00 - 21.00	Auto	0.0879
L28	28	FP 6.125 x 1.25 Reinforcement	11.00 - 16.00	Auto	0.0628
L28	29	FP 6.125 x 1.25 Reinforcement	11.00 - 16.00	Auto	0.0628
L28	30	FP 6.125 x 1.25 Reinforcement	11.00 - 16.00	Auto	0.0628
L29	28	FP 6.125 x 1.25 Reinforcement	6.00 - 11.00	Auto	0.0412
L29	29	FP 6.125 x 1.25 Reinforcement	6.00 - 11.00	Auto	0.0412
L29	30	FP 6.125 x 1.25 Reinforcement	6.00 - 11.00	Auto	0.0412
L30	28	FP 6.125 x 1.25 Reinforcement	1.00 - 6.00	Auto	0.0179
L30	29	FP 6.125 x 1.25 Reinforcement	1.00 - 6.00	Auto	0.0179
L30	30	FP 6.125 x 1.25 Reinforcement	1.00 - 6.00	Auto	0.0179
L31	28	FP 6.125 x 1.25 Reinforcement	0.00 - 1.00	Auto	0.0049
L31	29	FP 6.125 x 1.25 Reinforcement	0.00 - 1.00	Auto	0.0049

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L31	30	FP 6.125 x 1.25 Reinforcement	0.00 - 1.00	Auto	0.0049

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment ° ft	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
5/8" X 5' Lightning Rod	A	From Leg	0.00 0.00 2.50	0.0000	133.00	No Ice 1/2" Ice 1" Ice	0.31 0.83 1.32	0.31 0.83 1.32	0.01 0.01 0.02
******									
TPA65R-BU8D_CCIV2 w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	15.89 16.81 17.76	7.89 8.74 9.60	0.12 0.23 0.36
TPA65R-BU8D_CCIV2 w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	15.89 16.81 17.76	7.89 8.74 9.60	0.12 0.23 0.36
TPA65R-BU8D_CCIV2 w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	15.89 16.81 17.76	7.89 8.74 9.60	0.12 0.23 0.36
RRUS 4449 B5/B12	A	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33	1.41 1.56 1.73	0.07 0.09 0.11
RRUS 4449 B5/B12	B	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33	1.41 1.56 1.73	0.07 0.09 0.11
RRUS 4449 B5/B12	C	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	1.97 2.14 2.33	1.41 1.56 1.73	0.07 0.09 0.11
RRUS 4415 B25	A	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	0.68 0.79 0.91	0.04 0.06 0.07
RRUS 4415 B25	B	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	0.68 0.79 0.91	0.04 0.06 0.07
RRUS 4415 B25	C	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	0.68 0.79 0.91	0.04 0.06 0.07
DBC0111F2V62-1	A	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	1.10 1.23 1.37	1.06 1.19 1.33	0.05 0.06 0.08
DBC0111F2V62-1	B	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	1.10 1.23 1.37	1.06 1.19 1.33	0.05 0.06 0.08
DBC0111F2V62-1	C	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	1.10 1.23 1.37	1.06 1.19 1.33	0.05 0.06 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DC6-48-60-18-8F	A	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
DC6-48-60-18-8C-EV	B	From Leg	1.00 0.00 0.00	0.0000	132.00	No Ice 1/2" Ice 1" Ice	2.74 2.96 3.20	2.74 2.96 3.20	0.03 0.05 0.08
Side Arm Mount [SO 102-3]	A	None		0.0000	132.00	No Ice 1/2" Ice 1" Ice	3.60 4.18 4.75	3.60 4.18 4.75	0.07 0.11 0.14
******									
Platform Mount [LP 1201-1]	A	None		0.0000	120.00	No Ice 1/2" Ice 1" Ice	18.38 22.11 25.87	18.38 22.11 25.87	2.10 2.65 3.26
***									
AIR 6419 B41_TMO w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
AIR 6419 B41_TMO w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
AIR 6419 B41_TMO w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.58 7.06 7.57	3.50 3.90 4.32	0.11 0.16 0.22
VV-65B-R1_TMO w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	8.15 8.70 9.22	5.43 6.56 7.41	0.07 0.13 0.20
VV-65B-R1_TMO w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	8.15 8.70 9.22	5.43 6.56 7.41	0.07 0.13 0.20
VV-65B-R1_TMO w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	8.15 8.70 9.22	5.43 6.56 7.41	0.07 0.13 0.20
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	14.69 15.46 16.23	6.87 7.55 8.25	0.18 0.31 0.45
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	14.69 15.46 16.23	6.87 7.55 8.25	0.18 0.31 0.45
APXVAALL24_43-U-NA20_TMO w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	14.69 15.46 16.23	6.87 7.55 8.25	0.18 0.31 0.45
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.00 0.00 1.00	0.0000	120.00	No Ice 1/2" Ice	2.14 2.32 2.51	1.69 1.85 2.02	0.11 0.13 0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
Radio 4480_TMOV2	A	From Leg	4.00	0.0000	120.00	No Ice	2.88	1.40	0.08
			0.00			1/2"	3.09	1.56	0.10
			1.00			Ice	3.31	1.73	0.13
						1" Ice			
Radio 4480_TMOV2	B	From Leg	4.00	0.0000	120.00	No Ice	2.88	1.40	0.08
			0.00			1/2"	3.09	1.56	0.10
			1.00			Ice	3.31	1.73	0.13
						1" Ice			
Radio 4480_TMOV2	C	From Leg	4.00	0.0000	120.00	No Ice	2.88	1.40	0.08
			0.00			1/2"	3.09	1.56	0.10
			1.00			Ice	3.31	1.73	0.13
						1" Ice			
Site Pro 1 P30174	A	From Leg	4.00	0.0000	120.00	No Ice	3.74	0.01	0.08
			0.00			1/2"	4.86	0.05	0.11
			0.00			Ice	5.98	0.10	0.13
						1" Ice			
Site Pro 1 P30174	B	From Leg	4.00	0.0000	120.00	No Ice	3.74	0.01	0.08
			0.00			1/2"	4.86	0.05	0.11
			0.00			Ice	5.98	0.10	0.13
						1" Ice			
Site Pro 1 P30174	C	From Leg	4.00	0.0000	120.00	No Ice	3.74	0.01	0.08
			0.00			1/2"	4.86	0.05	0.11
			0.00			Ice	5.98	0.10	0.13
						1" Ice			
Site Pro 1 AHCP	A	None		0.0000	120.00	No Ice	1.17	0.02	0.07
						1/2"	1.52	0.03	0.09
						Ice	1.87	0.04	0.11
						1" Ice			
******									
******									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00	0.0000	111.00	No Ice	8.01	4.23	0.11
			0.00			1/2"	8.52	4.69	0.19
			0.00			Ice	9.04	5.16	0.29
						1" Ice			
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00	0.0000	111.00	No Ice	8.01	4.23	0.11
			0.00			1/2"	8.52	4.69	0.19
			0.00			Ice	9.04	5.16	0.29
						1" Ice			
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00	0.0000	111.00	No Ice	8.01	4.23	0.11
			0.00			1/2"	8.52	4.69	0.19
			0.00			Ice	9.04	5.16	0.29
						1" Ice			
TA08025-B604	A	From Leg	4.00	0.0000	111.00	No Ice	1.96	0.98	0.06
			0.00			1/2"	2.14	1.11	0.08
			0.00			Ice	2.32	1.25	0.10
						1" Ice			
TA08025-B604	B	From Leg	4.00	0.0000	111.00	No Ice	1.96	0.98	0.06
			0.00			1/2"	2.14	1.11	0.08
			0.00			Ice	2.32	1.25	0.10
						1" Ice			
TA08025-B604	C	From Leg	4.00	0.0000	111.00	No Ice	1.96	0.98	0.06
			0.00			1/2"	2.14	1.11	0.08
			0.00			Ice	2.32	1.25	0.10
						1" Ice			
TA08025-B605	A	From Leg	4.00	0.0000	111.00	No Ice	1.96	1.13	0.08
			0.00			1/2"	2.14	1.27	0.09
			0.00			Ice	2.32	1.41	0.11
						1" Ice			
TA08025-B605	B	From Leg	4.00	0.0000	111.00	No Ice	1.96	1.13	0.08
			0.00			1/2"	2.14	1.27	0.09
			0.00			Ice	2.32	1.41	0.11
						1" Ice			
TA08025-B605	C	From Leg	4.00	0.0000	111.00	No Ice	1.96	1.13	0.08
			0.00			1/2"	2.14	1.27	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice 1" Ice	2.32	1.41	0.11
RDIDC-9181-PF-48	A	From Leg	4.00 0.00 0.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice	2.01 2.19 2.37	1.17 1.31 1.46	0.02 0.04 0.06
(2) 8' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
(2) 8' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
(2) 8' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	111.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
Commscope MC-PK8-DSH	A	None		0.0000	111.00	No Ice 1/2" Ice 1" Ice	34.24 62.95 91.66	34.24 62.95 91.66	1.75 2.10 2.45
****** ******									
BXA-171063-8BF-2 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	2.85 3.34 3.85	3.00 3.49 4.00	0.04 0.06 0.10
BXA-171063-12CF-EDIN-X w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	4.34 5.08 5.83	4.58 5.31 6.07	0.05 0.09 0.14
BXA-171063-12CF-EDIN-X w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	4.34 5.08 5.83	4.58 5.31 6.07	0.05 0.09 0.14
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01
2.5' x 3" Pipe Mount	A	From Leg	2.00 0.00 0.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	0.71 0.91 1.09	0.71 0.91 1.09	0.03 0.04 0.05
Platform Mount [LP 1201-1]	A	None		0.0000	93.00	No Ice 1/2" Ice 1" Ice	18.38 22.11 25.87	18.38 22.11 25.87	2.10 2.65 3.26
***									
NHH-65B-R2B	A	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	4.16 4.56 4.98	2.49 2.88 3.27	0.04 0.09 0.15
NHH-65B-R2B	B	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	4.16 4.56 4.98	2.49 2.88 3.27	0.04 0.09 0.15

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
NHH-65B-R2B	C	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	4.16 4.56 4.98	2.49 2.88 3.27	0.04 0.09 0.15
NHHSS-65B-R2BT4	A	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	8.05 8.50 8.97	5.36 5.81 6.27	0.05 0.10 0.16
NHHSS-65B-R2BT4	B	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	8.05 8.50 8.97	5.36 5.81 6.27	0.05 0.10 0.16
NHHSS-65B-R2BT4	C	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	8.05 8.50 8.97	5.36 5.81 6.27	0.05 0.10 0.16
MT6407-77A w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
RF4439D-25A	A	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.25 1.39 1.54	0.07 0.09 0.11
RF4439D-25A	B	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.25 1.39 1.54	0.07 0.09 0.11
RF4439D-25A	C	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.25 1.39 1.54	0.07 0.09 0.11
CBRS RT4401-48A	A	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	0.99 1.12 1.26	0.50 0.60 0.70	0.02 0.03 0.04
CBRS RT4401-48A	B	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	0.99 1.12 1.26	0.50 0.60 0.70	0.02 0.03 0.04
CBRS RT4401-48A	C	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	0.99 1.12 1.26	0.50 0.60 0.70	0.02 0.03 0.04
RF4440D-13A	A	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.13 1.27 1.41	0.07 0.09 0.11
RF4440D-13A	B	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.13 1.27 1.41	0.07 0.09 0.11
RF4440D-13A	C	From Leg	4.00 0.00 1.00	0.0000	93.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.13 1.27 1.41	0.07 0.09 0.11
RVZDC-6627-PF-48	A	From Leg	4.00	0.0000	93.00	No Ice	3.79	2.51	0.03

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* ft ft ft	*Azimuth Adjustment* °	*Placement* ft		*C_AA_A Front* ft^2	*C_AA_A Side* ft^2	*Weight* K
			0.00			1/2" Ice	4.04	2.73	0.06
			1.00			1" Ice	4.30	2.95	0.10
RVZDC-6627-PF-48	B	From Leg	4.00	0.0000	93.00	No Ice	3.79	2.51	0.03
			0.00			1/2" Ice	4.04	2.73	0.06
			1.00			1" Ice	4.30	2.95	0.10
Commscope BASMNT-SBS-1-2	A	From Leg	4.00	0.0000	93.00	No Ice	1.73	1.73	0.04
			0.00			1/2" Ice	2.09	2.09	0.05
			0.00			1" Ice	2.46	2.46	0.07
Commscope BASMNT-SBS-1-2	B	From Leg	4.00	0.0000	93.00	No Ice	1.73	1.73	0.04
			0.00			1/2" Ice	2.09	2.09	0.05
			0.00			1" Ice	2.46	2.46	0.07
Commscope BASMNT-SBS-1-2	C	From Leg	4.00	0.0000	93.00	No Ice	1.73	1.73	0.04
			0.00			1/2" Ice	2.09	2.09	0.05
			0.00			1" Ice	2.46	2.46	0.07
13' Support Rail	A	From Leg	4.00	0.0000	93.00	No Ice	3.09	0.01	0.05
			0.00			1/2" Ice	4.42	0.05	0.07
			0.00			1" Ice	5.77	0.10	0.10
13' Support Rail	B	From Leg	4.00	0.0000	93.00	No Ice	3.09	0.01	0.05
			0.00			1/2" Ice	4.42	0.05	0.07
			0.00			1" Ice	5.77	0.10	0.10
13' Support Rail	C	From Leg	4.00	0.0000	93.00	No Ice	3.09	0.01	0.05
			0.00			1/2" Ice	4.42	0.05	0.07
			0.00			1" Ice	5.77	0.10	0.10
VZWSMART-PLK6	A	From Leg	2.00	0.0000	93.00	No Ice	6.32	4.85	0.11
			0.00			1/2" Ice	7.79	6.36	0.14
			0.00			1" Ice	9.36	7.94	0.17
VZWSMART-PLK6	B	From Leg	2.00	0.0000	93.00	No Ice	6.32	4.85	0.11
			0.00			1/2" Ice	7.79	6.36	0.14
			0.00			1" Ice	9.36	7.94	0.17
VZWSMART-PLK6	C	From Leg	2.00	0.0000	93.00	No Ice	6.32	4.85	0.11
			0.00			1/2" Ice	7.79	6.36	0.14
			0.00			1" Ice	9.36	7.94	0.17
VZWSMART-P40-278x072	A	From Leg	4.00	0.0000	93.00	No Ice	1.73	1.73	0.04
			0.00			1/2" Ice	2.09	2.09	0.05
			0.00			1" Ice	2.46	2.46	0.07
VZWSMART-P40-278x072	B	From Leg	4.00	0.0000	93.00	No Ice	1.73	1.73	0.04
			0.00			1/2" Ice	2.09	2.09	0.05
			0.00			1" Ice	2.46	2.46	0.07
VZWSMART-P40-278x072	C	From Leg	4.00	0.0000	93.00	No Ice	1.73	1.73	0.04
			0.00			1/2" Ice	2.09	2.09	0.05
			0.00			1" Ice	2.46	2.46	0.07
VZWSMART-PLK7	A	None		0.0000	93.00	No Ice	3.60	3.60	0.15
						1/2" Ice	4.18	4.18	0.20
						1" Ice	4.75	4.75	0.24
******									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.00	0.0000	75.00	No Ice	3.79	3.16	0.05
			0.00			1/2" Ice	4.38	3.75	0.09
			0.00			1" Ice	4.99	4.35	0.15
APXV18-206517S-C w/	B	From Leg	1.00	0.0000	75.00	No Ice	3.79	3.16	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.00 0.00			1/2" Ice 1" Ice	4.38 4.99	3.75 4.35	0.09 0.15
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	3.79 4.38 4.99	3.16 3.75 4.35	0.05 0.09 0.15
******									
KS24019-L112A	A	From Leg	6.00 0.00 1.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.14 0.20 0.26	0.01 0.01 0.01
Side Arm Mount [SO 702-1]	A	From Leg	3.00 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice	0.62 0.74 0.89	1.49 2.07 2.54	0.03 0.04 0.06
******									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service

Comb. No.	Description
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	133 - 128	Pole	Max Tension	39	0.00	0.00	-0.00
			Max. Compression	26	-2.79	-0.11	0.05
			Max. Mx	8	-1.23	-10.20	0.02
			Max. My	2	-1.22	-0.03	10.17
			Max. Vy	8	2.60	-10.20	0.02
			Max. Vx	2	-2.60	-0.03	10.17
			Max. Torque	2			-0.15
L2	128 - 123	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-3.26	-0.10	0.05
			Max. Mx	8	-1.58	-23.72	0.03
			Max. My	2	-1.58	-0.02	23.71
			Max. Vy	8	2.81	-23.72	0.03
			Max. Vx	2	-2.81	-0.02	23.71
			Max. Torque	2			-0.15
L3	123 - 118	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.69	-0.08	0.07
			Max. Mx	8	-6.25	-50.82	0.03
			Max. My	2	-6.25	-0.01	50.83
			Max. Vy	20	-7.78	50.76	0.04
			Max. Vx	2	-7.78	-0.01	50.83
			Max. Torque	2			-0.15
L4	118 - 113	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12.22	-0.06	0.09
			Max. Mx	8	-6.60	-90.59	0.04
			Max. My	2	-6.60	-0.00	90.62
			Max. Vy	20	-8.14	90.55	0.05
			Max. Vx	2	-8.14	-0.00	90.62
			Max. Torque	2			-0.15
L5	113 - 108	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-17.64	-0.04	0.43
			Max. Mx	8	-9.83	-142.21	0.15
			Max. My	2	-9.83	0.01	142.48
			Max. Vy	20	-11.85	142.19	0.17
			Max. Vx	2	-11.88	0.01	142.48
			Max. Torque	10			0.25
L6	108 - 103	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.21	-0.03	0.45
			Max. Mx	8	-10.25	-202.28	0.16
			Max. My	2	-10.24	0.02	202.73
			Max. Vy	20	-12.19	202.28	0.19
			Max. Vx	2	-12.23	0.02	202.73
			Max. Torque	10			0.25
L7	103 - 98	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.79	-0.01	0.48
			Max. Mx	20	-10.68	264.08	0.21
			Max. My	2	-10.67	0.03	264.70
			Max. Vy	20	-12.53	264.08	0.21
			Max. Vx	2	-12.57	0.03	264.70
			Max. Torque	10			0.25
L8	98 - 93	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.38	0.01	0.51

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	20	-11.14	327.57	0.23
			Max. My	2	-11.13	0.05	328.35
			Max. Vy	20	-12.87	327.57	0.23
			Max. Vx	2	-12.90	0.05	328.35
			Max. Torque	10			0.25
L9	93 - 88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-28.34	-0.25	1.05
			Max. Mx	8	-16.30	-420.52	0.26
			Max. My	2	-16.29	0.09	421.78
			Max. Vy	20	-18.24	420.36	0.56
			Max. Vx	2	-18.29	0.09	421.78
			Max. Torque	22			-0.73
L10	88 - 82.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-28.64	-0.24	1.06
			Max. Mx	8	-16.56	-461.67	0.21
			Max. My	2	-16.55	0.15	463.06
			Max. Vy	20	-18.37	461.52	0.62
			Max. Vx	2	-18.42	0.15	463.06
			Max. Torque	22			-0.73
L11	82.25 - 80.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-29.76	-0.22	1.09
			Max. Mx	8	-17.43	-554.39	0.12
			Max. My	2	-17.42	0.27	556.09
			Max. Vy	20	-18.74	554.27	0.75
			Max. Vx	2	-18.79	0.27	556.09
			Max. Torque	22			-0.73
L12	80.75 - 75.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-30.54	-0.20	1.12
			Max. Mx	8	-18.14	-648.74	0.03
			Max. My	2	-18.13	0.39	650.73
			Max. Vy	20	-19.03	648.64	0.87
			Max. Vx	2	-19.09	0.39	650.73
			Max. Torque	22			-0.73
L13	75.75 - 70.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.82	-0.14	1.15
			Max. Mx	8	-19.05	-746.08	-0.06
			Max. My	2	-19.04	0.51	748.37
			Max. Vy	20	-19.68	746.02	1.00
			Max. Vx	2	-19.74	0.51	748.37
			Max. Torque	22			-0.73
L14	70.75 - 65.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.69	-0.08	1.18
			Max. Mx	8	-19.82	-845.08	-0.15
			Max. My	2	-19.82	0.64	847.68
			Max. Vy	20	-19.96	845.07	1.13
			Max. Vx	2	-20.01	0.64	847.68
			Max. Torque	22			-0.73
L15	65.75 - 60.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.57	-0.02	1.22
			Max. Mx	20	-20.62	945.45	1.26
			Max. My	2	-20.62	0.78	948.32
			Max. Vy	20	-20.22	945.45	1.26
			Max. Vx	2	-20.27	0.78	948.32
			Max. Torque	22			-0.73
L16	60.75 - 57.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.13	0.02	1.24
			Max. Mx	20	-21.12	1006.29	1.33
			Max. My	2	-21.11	0.85	1009.32
			Max. Vy	20	-20.37	1006.29	1.33
			Max. Vx	2	-20.42	0.85	1009.32
			Max. Torque	22			-0.73
L17	57.75 - 57.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.20	0.02	1.24

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	20	-21.19	1011.38	1.34
			Max. My	2	-21.18	0.86	1014.43
			Max. Vy	20	-20.37	1011.38	1.34
			Max. Vx	2	-20.43	0.86	1014.43
			Max. Torque	22			-0.73
L18	57.5 - 52.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.55	0.08	1.28
			Max. Mx	20	-22.31	1114.07	1.47
			Max. My	2	-22.31	0.99	1117.38
			Max. Vy	20	-20.71	1114.07	1.47
			Max. Vx	2	-20.77	0.99	1117.38
			Max. Torque	22			-0.73
L19	52.5 - 47.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.99	0.14	1.66
			Max. Mx	20	-23.50	1218.58	1.77
			Max. My	2	-23.50	1.12	1222.25
			Max. Vy	20	-21.10	1218.58	1.77
			Max. Vx	2	-21.12	1.12	1222.25
			Max. Torque	22			-0.97
L20	47.5 - 40.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.69	0.17	1.69
			Max. Mx	20	-24.08	1271.51	1.83
			Max. My	2	-24.08	1.19	1275.23
			Max. Vy	20	-21.26	1271.51	1.83
			Max. Vx	2	-21.28	1.19	1275.23
			Max. Torque	22			-0.97
L21	40.75 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-40.07	0.22	1.73
			Max. Mx	20	-26.05	1378.77	1.96
			Max. My	2	-26.05	1.32	1382.58
			Max. Vy	20	-21.65	1378.77	1.96
			Max. Vx	2	-21.67	1.32	1382.58
			Max. Torque	22			-0.97
L22	40 - 35	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.54	0.28	1.77
			Max. Mx	20	-27.31	1487.69	2.08
			Max. My	2	-27.30	1.45	1491.59
			Max. Vy	20	-21.93	1487.69	2.08
			Max. Vx	2	-21.95	1.45	1491.59
			Max. Torque	22			-0.97
L23	35 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.01	0.33	1.82
			Max. Mx	20	-28.58	1597.98	2.21
			Max. My	2	-28.58	1.58	1601.98
			Max. Vy	20	-22.20	1597.98	2.21
			Max. Vx	2	-22.22	1.58	1601.98
			Max. Torque	22			-0.97
L24	30 - 26.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.14	0.37	1.85
			Max. Mx	20	-29.55	1681.57	2.30
			Max. My	2	-29.54	1.68	1685.63
			Max. Vy	20	-22.40	1681.57	2.30
			Max. Vx	2	-22.42	1.68	1685.63
			Max. Torque	22			-0.97
L25	26.25 - 26	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.22	0.38	1.85
			Max. Mx	20	-29.63	1687.16	2.31
			Max. My	2	-29.62	1.69	1691.23
			Max. Vy	20	-22.40	1687.16	2.31
			Max. Vx	2	-22.42	1.69	1691.23
			Max. Torque	22			-0.97
L26	26 - 21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45.82	0.43	1.90
			Max. Mx	20	-31.01	1799.77	2.43
			Max. My	2	-31.01	1.82	1803.92
			Max. Vy	20	-22.65	1799.77	2.43
			Max. Vx	2	-22.67	1.82	1803.92
			Max. Torque	22			-0.97
L27	21 - 16	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-47.43	0.49	1.94
			Max. Mx	20	-32.42	1913.55	2.55
			Max. My	2	-32.42	1.95	1917.79
			Max. Vy	20	-22.88	1913.55	2.55
			Max. Vx	2	-22.90	1.95	1917.79
			Max. Torque	22			-0.97
L28	16 - 11	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-49.05	0.54	1.99
			Max. Mx	20	-33.84	2028.40	2.68
			Max. My	2	-33.84	2.08	2032.72
			Max. Vy	20	-23.08	2028.40	2.68
			Max. Vx	2	-23.10	2.08	2032.72
			Max. Torque	22			-0.97
L29	11 - 6	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.59	0.57	2.02
			Max. Mx	20	-35.21	2144.22	2.79
			Max. My	2	-35.21	2.20	2148.63
			Max. Vy	20	-23.27	2144.22	2.79
			Max. Vx	2	-23.29	2.20	2148.63
			Max. Torque	22			-0.97
L30	6 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.99	0.57	2.02
			Max. Mx	20	-36.49	2260.98	2.89
			Max. My	2	-36.49	2.31	2265.48
			Max. Vy	20	-23.46	2260.98	2.89
			Max. Vx	2	-23.48	2.31	2265.48
			Max. Torque	22			-0.97
L31	1 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.27	0.57	2.02
			Max. Mx	20	-36.75	2284.44	2.91
			Max. My	2	-36.75	2.33	2288.96
			Max. Vy	20	-23.50	2284.44	2.91
			Max. Vx	2	-23.52	2.33	2288.96
			Max. Torque	22			-0.97

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	52.27	0.00	6.55
	Max. H_x	20	36.77	23.48	0.02
	Max. H_z	2	36.77	0.02	23.50
	Max. M_x	2	2288.96	0.02	23.50
	Max. M_z	8	2283.89	-23.48	-0.02
	Max. Torsion	10	0.97	-20.35	-11.77
	Min. Vert	19	27.57	20.33	-11.73
	Min. H_x	8	36.77	-23.48	-0.02
	Min. H_z	14	36.77	-0.02	-23.50
	Min. M_x	14	-2287.22	-0.02	-23.50
	Min. M_z	20	-2284.44	23.48	0.02
	Min. Torsion	22	-0.97	20.35	11.77

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	30.64	0.00	0.00	-0.67	0.22	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	36.77	-0.02	-23.50	-2288.96	2.33	0.30
0.9 Dead+1.0 Wind 0 deg - No Ice	27.57	-0.02	-23.50	-2253.85	2.23	0.29
1.2 Dead+1.0 Wind 30 deg - No Ice	36.77	11.72	-20.34	-1981.41	-1140.03	-0.22
0.9 Dead+1.0 Wind 30 deg - No Ice	27.57	11.72	-20.34	-1950.98	-1122.72	-0.22
1.2 Dead+1.0 Wind 60 deg - No Ice	36.77	20.33	-11.73	-1143.15	-1976.85	-0.67
0.9 Dead+1.0 Wind 60 deg - No Ice	27.57	20.33	-11.73	-1125.51	-1946.79	-0.66
1.2 Dead+1.0 Wind 90 deg - No Ice	36.77	23.48	0.02	1.18	-2283.89	-0.94
0.9 Dead+1.0 Wind 90 deg - No Ice	27.57	23.48	0.02	1.39	-2249.16	-0.93
1.2 Dead+1.0 Wind 120 deg - No Ice	36.77	20.35	11.77	1144.96	-1978.88	-0.97
0.9 Dead+1.0 Wind 120 deg - No Ice	27.57	20.35	11.77	1127.73	-1948.80	-0.96
1.2 Dead+1.0 Wind 150 deg - No Ice	36.77	11.76	20.36	1981.70	-1143.57	-0.73
0.9 Dead+1.0 Wind 150 deg - No Ice	27.57	11.76	20.36	1951.71	-1126.21	-0.72
1.2 Dead+1.0 Wind 180 deg - No Ice	36.77	0.02	23.50	2287.22	-1.77	-0.30
0.9 Dead+1.0 Wind 180 deg - No Ice	27.57	0.02	23.50	2252.57	-1.81	-0.29
1.2 Dead+1.0 Wind 210 deg - No Ice	36.77	-11.72	20.34	1979.66	1140.58	0.21
0.9 Dead+1.0 Wind 210 deg - No Ice	27.57	-11.72	20.34	1949.70	1123.13	0.21
1.2 Dead+1.0 Wind 240 deg - No Ice	36.77	-20.33	11.73	1141.41	1977.40	0.67
0.9 Dead+1.0 Wind 240 deg - No Ice	27.57	-20.33	11.73	1124.23	1947.20	0.66
1.2 Dead+1.0 Wind 270 deg - No Ice	36.77	-23.48	-0.02	-2.91	2284.44	0.95
0.9 Dead+1.0 Wind 270 deg - No Ice	27.57	-23.48	-0.02	-2.66	2249.56	0.94
1.2 Dead+1.0 Wind 300 deg - No Ice	36.77	-20.35	-11.77	-1146.69	1979.44	0.97
0.9 Dead+1.0 Wind 300 deg - No Ice	27.57	-20.35	-11.77	-1129.00	1949.21	0.96
1.2 Dead+1.0 Wind 330 deg - No Ice	36.77	-11.76	-20.36	-1983.44	1144.13	0.73
0.9 Dead+1.0 Wind 330 deg - No Ice	27.57	-11.76	-20.36	-1952.99	1126.63	0.72
1.2 Dead+1.0 Ice+1.0 Temp	52.27	-0.00	-0.00	-2.02	0.57	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	52.27	-0.00	-6.55	-647.97	1.00	0.07
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	52.27	3.27	-5.67	-561.25	-321.69	-0.07
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	52.27	5.67	-3.27	-324.71	-558.02	-0.19
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	52.27	6.55	0.00	-1.74	-644.67	-0.26
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	52.27	5.68	3.28	321.12	-558.42	-0.26
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	52.27	3.28	5.68	557.37	-322.38	-0.19
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	52.27	0.00	6.55	643.69	0.20	-0.07
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	52.27	-3.27	5.67	556.97	322.88	0.07

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	52.27	-5.67	3.27	320.43	559.21	0.19
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	52.27	-6.55	-0.00	-2.54	645.86	0.26
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	52.27	-5.68	-3.28	-325.40	559.62	0.26
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	52.27	-3.28	-5.68	-561.65	323.58	0.19
Dead+Wind 0 deg - Service	30.64	-0.01	-5.72	-553.44	0.72	0.07
Dead+Wind 30 deg - Service	30.64	2.86	-4.95	-479.14	-275.23	-0.05
Dead+Wind 60 deg - Service	30.64	4.95	-2.86	-276.65	-477.37	-0.17
Dead+Wind 90 deg - Service	30.64	5.72	0.01	-0.23	-551.53	-0.23
Dead+Wind 120 deg - Service	30.64	4.96	2.87	276.07	-477.87	-0.24
Dead+Wind 150 deg - Service	30.64	2.86	4.96	478.20	-276.09	-0.18
Dead+Wind 180 deg - Service	30.64	0.01	5.72	551.99	-0.27	-0.07
Dead+Wind 210 deg - Service	30.64	-2.86	4.95	477.70	275.68	0.05
Dead+Wind 240 deg - Service	30.64	-4.95	2.86	275.21	477.83	0.17
Dead+Wind 270 deg - Service	30.64	-5.72	-0.01	-1.22	552.00	0.23
Dead+Wind 300 deg - Service	30.64	-4.96	-2.87	-277.51	478.32	0.24
Dead+Wind 330 deg - Service	30.64	-2.86	-4.96	-479.64	276.54	0.18

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-30.64	0.00	0.00	30.64	0.00	0.000%
2	-0.02	-36.77	-23.50	0.02	36.77	23.50	0.000%
3	-0.02	-27.57	-23.50	0.02	27.57	23.50	0.000%
4	11.72	-36.77	-20.34	-11.72	36.77	20.34	0.000%
5	11.72	-27.57	-20.34	-11.72	27.57	20.34	0.000%
6	20.33	-36.77	-11.73	-20.33	36.77	11.73	0.000%
7	20.33	-27.57	-11.73	-20.33	27.57	11.73	0.000%
8	23.48	-36.77	0.02	-23.48	36.77	-0.02	0.000%
9	23.48	-27.57	0.02	-23.48	27.57	-0.02	0.000%
10	20.35	-36.77	11.77	-20.35	36.77	-11.77	0.000%
11	20.35	-27.57	11.77	-20.35	27.57	-11.77	0.000%
12	11.76	-36.77	20.36	-11.76	36.77	-20.36	0.000%
13	11.76	-27.57	20.36	-11.76	27.57	-20.36	0.000%
14	0.02	-36.77	23.50	-0.02	36.77	-23.50	0.000%
15	0.02	-27.57	23.50	-0.02	27.57	-23.50	0.000%
16	-11.72	-36.77	20.34	11.72	36.77	-20.34	0.000%
17	-11.72	-27.57	20.34	11.72	27.57	-20.34	0.000%
18	-20.33	-36.77	11.73	20.33	36.77	-11.73	0.000%
19	-20.33	-27.57	11.73	20.33	27.57	-11.73	0.000%
20	-23.48	-36.77	-0.02	23.48	36.77	0.02	0.000%
21	-23.48	-27.57	-0.02	23.48	27.57	0.02	0.000%
22	-20.35	-36.77	-11.77	20.35	36.77	11.77	0.000%
23	-20.35	-27.57	-11.77	20.35	27.57	11.77	0.000%
24	-11.76	-36.77	-20.36	11.76	36.77	20.36	0.000%
25	-11.76	-27.57	-20.36	11.76	27.57	20.36	0.000%
26	0.00	-52.27	0.00	0.00	52.27	0.00	0.000%
27	-0.00	-52.27	-6.55	0.00	52.27	6.55	0.000%
28	3.27	-52.27	-5.67	-3.27	52.27	5.67	0.000%
29	5.67	-52.27	-3.27	-5.67	52.27	3.27	0.000%
30	6.55	-52.27	0.00	-6.55	52.27	-0.00	0.000%
31	5.68	-52.27	3.28	-5.68	52.27	-3.28	0.000%
32	3.28	-52.27	5.68	-3.28	52.27	-5.68	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	0.00	-52.27	6.55	-0.00	52.27	-6.55	0.000%
34	-3.27	-52.27	5.67	3.27	52.27	-5.67	0.000%
35	-5.67	-52.27	3.27	5.67	52.27	-3.27	0.000%
36	-6.55	-52.27	-0.00	6.55	52.27	0.00	0.000%
37	-5.68	-52.27	-3.28	5.68	52.27	3.28	0.000%
38	-3.28	-52.27	-5.68	3.28	52.27	5.68	0.000%
39	-0.01	-30.64	-5.72	0.01	30.64	5.72	0.000%
40	2.86	-30.64	-4.95	-2.86	30.64	4.95	0.000%
41	4.95	-30.64	-2.86	-4.95	30.64	2.86	0.000%
42	5.72	-30.64	0.01	-5.72	30.64	-0.01	0.000%
43	4.96	-30.64	2.87	-4.96	30.64	-2.87	0.000%
44	2.86	-30.64	4.96	-2.86	30.64	-4.96	0.000%
45	0.01	-30.64	5.72	-0.01	30.64	-5.72	0.000%
46	-2.86	-30.64	4.95	2.86	30.64	-4.95	0.000%
47	-4.95	-30.64	2.86	4.95	30.64	-2.86	0.000%
48	-5.72	-30.64	-0.01	5.72	30.64	0.01	0.000%
49	-4.96	-30.64	-2.87	4.96	30.64	2.87	0.000%
50	-2.86	-30.64	-4.96	2.86	30.64	4.96	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00030377
3	Yes	5	0.00000001	0.00011979
4	Yes	7	0.00000001	0.00009666
5	Yes	6	0.00000001	0.00043629
6	Yes	7	0.00000001	0.00009821
7	Yes	6	0.00000001	0.00044362
8	Yes	5	0.00000001	0.00061963
9	Yes	5	0.00000001	0.00027906
10	Yes	7	0.00000001	0.00009522
11	Yes	6	0.00000001	0.00042967
12	Yes	7	0.00000001	0.00009864
13	Yes	6	0.00000001	0.00044566
14	Yes	5	0.00000001	0.00035678
15	Yes	5	0.00000001	0.00014810
16	Yes	7	0.00000001	0.00009717
17	Yes	6	0.00000001	0.00043889
18	Yes	7	0.00000001	0.00009557
19	Yes	6	0.00000001	0.00043146
20	Yes	5	0.00000001	0.00069658
21	Yes	5	0.00000001	0.00031546
22	Yes	7	0.00000001	0.00009920
23	Yes	6	0.00000001	0.00044812
24	Yes	7	0.00000001	0.00009582
25	Yes	6	0.00000001	0.00043222
26	Yes	4	0.00000001	0.00013309
27	Yes	6	0.00000001	0.00065824
28	Yes	6	0.00000001	0.00081072
29	Yes	6	0.00000001	0.00081293
30	Yes	6	0.00000001	0.00065446
31	Yes	6	0.00000001	0.00080220
32	Yes	6	0.00000001	0.00080680
33	Yes	6	0.00000001	0.00065196
34	Yes	6	0.00000001	0.00080471
35	Yes	6	0.00000001	0.00080194
36	Yes	6	0.00000001	0.00065467
37	Yes	6	0.00000001	0.00081540
38	Yes	6	0.00000001	0.00081132
39	Yes	4	0.00000001	0.00085351
40	Yes	5	0.00000001	0.00034045
41	Yes	5	0.00000001	0.00035463
42	Yes	4	0.00000001	0.00099519
43	Yes	5	0.00000001	0.00032730

44	Yes	5	0.00000001	0.00035634
45	Yes	4	0.00000001	0.00085436
46	Yes	5	0.00000001	0.00034416
47	Yes	5	0.00000001	0.00033067
48	Yes	5	0.00000001	0.00006683
49	Yes	5	0.00000001	0.00036311
50	Yes	5	0.00000001	0.00033331

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	133 - 128	26.460	39	1.7191	0.0022
L2	128 - 123	24.661	39	1.7152	0.0021
L3	123 - 118	22.872	39	1.6996	0.0020
L4	118 - 113	21.099	39	1.6854	0.0020
L5	113 - 108	19.347	39	1.6588	0.0020
L6	108 - 103	17.630	39	1.6195	0.0019
L7	103 - 98	15.961	39	1.5657	0.0018
L8	98 - 93	14.356	50	1.4991	0.0017
L9	93 - 88	12.826	50	1.4218	0.0016
L10	88 - 82.25	11.384	50	1.3315	0.0014
L11	85.75 - 80.75	10.767	50	1.2866	0.0013
L12	80.75 - 75.75	9.446	50	1.2272	0.0012
L13	75.75 - 70.75	8.209	50	1.1342	0.0010
L14	70.75 - 65.75	7.073	50	1.0346	0.0009
L15	65.75 - 60.75	6.045	50	0.9294	0.0008
L16	60.75 - 57.75	5.129	50	0.8195	0.0006
L17	57.75 - 57.5	4.635	50	0.7517	0.0006
L18	57.5 - 52.5	4.596	50	0.7486	0.0006
L19	52.5 - 47.5	3.845	50	0.6839	0.0005
L20	47.5 - 40.75	3.164	50	0.6169	0.0005
L21	45 - 40	2.850	50	0.5829	0.0004
L22	40 - 35	2.258	50	0.5438	0.0004
L23	35 - 30	1.725	50	0.4739	0.0003
L24	30 - 26.25	1.265	50	0.4035	0.0003
L25	26.25 - 26	0.969	50	0.3505	0.0002
L26	26 - 21	0.951	50	0.3473	0.0002
L27	21 - 16	0.622	50	0.2815	0.0002
L28	16 - 11	0.362	50	0.2156	0.0001
L29	11 - 6	0.171	50	0.1483	0.0001
L30	6 - 1	0.051	50	0.0811	0.0000
L31	1 - 0	0.001	50	0.0134	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
133.00	5/8" X 5' Lightning Rod	39	26.460	1.7191	0.0022	29779
132.00	TPA65R-BU8D_CCIV2 w/ Mount Pipe	39	26.100	1.7190	0.0022	29779
120.00	Platform Mount [LP 1201-1]	39	21.806	1.6916	0.0020	16326
111.00	MX08FRO665-21 w/ Mount Pipe	39	18.655	1.6446	0.0019	7489
93.00	BXA-171063-8BF-2 w/ Mount Pipe	50	12.826	1.4218	0.0016	3437
75.00	APXV18-206517S-C w/ Mount Pipe	50	8.032	1.1190	0.0010	2932
50.00	KS24019-L112A	50	3.496	0.6512	0.0005	4244

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	133 - 128	109.490	2	7.1249	0.0088
L2	128 - 123	102.052	2	7.1093	0.0086
L3	123 - 118	94.655	2	7.0450	0.0083
L4	118 - 113	87.323	2	6.9864	0.0082
L5	113 - 108	80.078	2	6.8762	0.0080
L6	108 - 103	72.974	2	6.7139	0.0077
L7	103 - 98	66.071	2	6.4908	0.0073
L8	98 - 93	59.428	2	6.2147	0.0069
L9	93 - 88	53.096	2	5.8938	0.0065
L10	88 - 82.25	47.125	2	5.5200	0.0056
L11	85.75 - 80.75	44.571	2	5.3336	0.0052
L12	80.75 - 75.75	39.103	2	5.0875	0.0047
L13	75.75 - 70.75	33.981	2	4.7016	0.0042
L14	70.75 - 65.75	29.278	2	4.2882	0.0036
L15	65.75 - 60.75	25.018	2	3.8514	0.0031
L16	60.75 - 57.75	21.227	24	3.3954	0.0026
L17	57.75 - 57.5	19.183	24	3.1141	0.0024
L18	57.5 - 52.5	19.021	24	3.1010	0.0024
L19	52.5 - 47.5	15.916	24	2.8327	0.0021
L20	47.5 - 40.75	13.096	24	2.5547	0.0019
L21	45 - 40	11.796	24	2.4139	0.0017
L22	40 - 35	9.344	24	2.2519	0.0016
L23	35 - 30	7.138	24	1.9623	0.0013
L24	30 - 26.25	5.237	24	1.6706	0.0011
L25	26.25 - 26	4.011	24	1.4509	0.0009
L26	26 - 21	3.935	24	1.4376	0.0009
L27	21 - 16	2.573	24	1.1650	0.0007
L28	16 - 11	1.496	24	0.8923	0.0005
L29	11 - 6	0.707	24	0.6134	0.0004
L30	6 - 1	0.210	24	0.3355	0.0002
L31	1 - 0	0.006	24	0.0555	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
133.00	5/8" X 5' Lightning Rod	2	109.490	7.1249	0.0088	7512
132.00	TPA65R-BU8D_CCIV2 w/ Mount Pipe	2	108.001	7.1245	0.0088	7512
120.00	Platform Mount [LP 1201-1]	2	90.248	7.0121	0.0082	4072
111.00	MX08FRO665-21 w/ Mount Pipe	2	77.216	6.8177	0.0079	1857
93.00	BXA-171063-8BF-2 w/ Mount Pipe	2	53.096	5.8938	0.0065	845
75.00	APXV18-206517S-C w/ Mount Pipe	2	33.248	4.6387	0.0041	715
50.00	KS24019-L112A	24	14.468	2.6972	0.0020	1028

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
L1	133 - 128 (1)	TP14x14x0.375	5.00	0.00	0.0	16.0516	-1.23	606.75	0.002
L2	128 - 123 (2)	TP14x14x0.375	5.00	0.00	0.0	16.0516	-1.58	606.75	0.003
L3	123 - 118 (3)	TP22.7502x22x0.1875	5.00	0.00	0.0	13.4276	-6.25	725.09	0.009
L4	118 - 113 (4)	TP23.5004x22.7502x0.1875	5.00	0.00	0.0	13.8741	-6.60	749.20	0.009
L5	113 - 108 (5)	TP24.2506x23.5004x0.1875	5.00	0.00	0.0	14.3205	-9.83	773.31	0.013
L6	108 - 103 (6)	TP25.0007x24.2506x0.1875	5.00	0.00	0.0	14.7670	-10.24	797.42	0.013
L7	103 - 98 (7)	TP25.7509x25.0007x0.1875	5.00	0.00	0.0	15.2134	-10.67	821.52	0.013
L8	98 - 93 (8)	TP26.5011x25.7509x0.1875	5.00	0.00	0.0	15.6599	-11.13	845.63	0.013
L9	93 - 88 (9)	TP27.2513x26.5011x0.1875	5.00	0.00	0.0	16.1063	-16.29	869.74	0.019
L10	88 - 82.25 (10)	TP28.114x27.2513x0.1875	5.75	0.00	0.0	16.3072	-16.55	880.59	0.019
L11	82.25 - 80.75 (11)	TP27.9641x27.2139x0.25	5.00	0.00	0.0	21.9911	-17.42	1286.48	0.014
L12	80.75 - 75.75 (12)	TP28.7143x27.9641x0.25	5.00	0.00	0.0	22.5865	-18.13	1321.31	0.014
L13	75.75 - 70.75 (13)	TP29.4646x28.7143x0.25	5.00	0.00	0.0	23.1818	-19.04	1356.13	0.014
L14	70.75 - 65.75 (14)	TP30.2148x29.4646x0.25	5.00	0.00	0.0	23.7771	-19.82	1390.96	0.014
L15	65.75 - 60.75 (15)	TP30.9651x30.2148x0.25	5.00	0.00	0.0	24.3724	-20.62	1425.79	0.014
L16	60.75 - 57.75 (16)	TP31.4152x30.9651x0.25	3.00	0.00	0.0	24.7296	-21.11	1446.68	0.015
L17	57.75 - 57.5 (17)	TP31.4527x31.4152x0.4625	0.25	0.00	0.0	45.4929	-21.18	2661.33	0.008
L18	57.5 - 52.5 (18)	TP32.2029x31.4527x0.4563	5.00	0.00	0.0	45.9736	-22.31	2689.45	0.008
L19	52.5 - 47.5 (19)	TP32.9532x32.2029x0.45	5.00	0.00	0.0	46.4243	-23.49	2715.82	0.009
L20	47.5 - 40.75 (20)	TP33.966x32.9532x0.45	6.75	0.00	0.0	46.9601	-24.08	2747.16	0.009
L21	40.75 - 40 (21)	TP33.5785x32.8283x0.4813	5.00	0.00	0.0	50.5556	-26.05	2957.50	0.009
L22	40 - 35 (22)	TP34.3287x33.5785x0.4688	5.00	0.00	0.0	50.3772	-27.30	2947.07	0.009
L23	35 - 30 (23)	TP35.0789x34.3287x0.4688	5.00	0.00	0.0	51.4934	-28.58	3012.36	0.009
L24	30 - 26.25 (24)	TP35.6415x35.0789x0.4688	3.75	0.00	0.0	52.3305	-29.54	3061.33	0.010
L25	26.25 - 26 (25)	TP35.679x35.6415x0.5188	0.25	0.00	0.0	57.8918	-29.62	3386.67	0.009
L26	26 - 21 (26)	TP36.4292x35.679x0.5063	5.00	0.00	0.0	57.7224	-31.01	3376.76	0.009
L27	21 - 16 (27)	TP37.1794x36.4292x0.5063	5.00	0.00	0.0	58.9278	-32.42	3447.28	0.009
L28	16 - 11 (28)	TP37.9296x37.1794x0.4938	5.00	0.00	0.0	58.6680	-33.84	3432.08	0.010
L29	11 - 6 (29)	TP38.6798x37.9296x0.4938	5.00	0.00	0.0	59.8437	-35.21	3500.86	0.010
L30	6 - 1 (30)	TP39.43x38.6798x0.4875	5.00	0.00	0.0	60.2566	-36.49	3525.01	0.010
L31	1 - 0 (31)	TP39.58x39.43x0.4875	1.00	0.00	0.0	60.4888	-36.75	3538.60	0.010

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	

Pole Bending Design Data

Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	133 - 128 (1)	TP14x14x0.375	10.20	219.34	0.046	0.00	219.34	0.000
L2	128 - 123 (2)	TP14x14x0.375	23.73	219.34	0.108	0.00	219.34	0.000
L3	123 - 118 (3)	TP22.7502x22x0.1875	50.83	404.88	0.126	0.00	404.88	0.000
L4	118 - 113 (4)	TP23.5004x22.7502x0.1875	90.62	427.97	0.212	0.00	427.97	0.000
L5	113 - 108 (5)	TP24.2506x23.5004x0.1875	142.48	451.39	0.316	0.00	451.39	0.000
L6	108 - 103 (6)	TP25.0007x24.2506x0.1875	202.73	475.10	0.427	0.00	475.10	0.000
L7	103 - 98 (7)	TP25.7509x25.0007x0.1875	264.70	499.08	0.530	0.00	499.08	0.000
L8	98 - 93 (8)	TP26.5011x25.7509x0.1875	328.35	523.31	0.627	0.00	523.31	0.000
L9	93 - 88 (9)	TP27.2513x26.5011x0.1875	421.78	547.75	0.770	0.00	547.75	0.000
L10	88 - 82.25 (10)	TP28.114x27.2513x0.1875	463.06	558.81	0.829	0.00	558.81	0.000
L11	82.25 - 80.75 (11)	TP27.9641x27.2139x0.25	556.09	893.20	0.623	0.00	893.20	0.000
L12	80.75 - 75.75 (12)	TP28.7143x27.9641x0.25	650.73	935.05	0.696	0.00	935.05	0.000
L13	75.75 - 70.75 (13)	TP29.4646x28.7143x0.25	748.37	977.43	0.766	0.00	977.43	0.000
L14	70.75 - 65.75 (14)	TP30.2148x29.4646x0.25	847.68	1020.31	0.831	0.00	1020.31	0.000
L15	65.75 - 60.75 (15)	TP30.9651x30.2148x0.25	948.32	1063.66	0.892	0.00	1063.66	0.000
L16	60.75 - 57.75 (16)	TP31.4152x30.9651x0.25	1009.33	1089.88	0.926	0.00	1089.88	0.000
L17	57.75 - 57.5 (17)	TP31.4527x31.4152x0.4625	1014.44	2138.88	0.474	0.00	2138.88	0.000
L18	57.5 - 52.5 (18)	TP32.2029x31.4527x0.4563	1117.43	2215.45	0.504	0.00	2215.45	0.000
L19	52.5 - 47.5 (19)	TP32.9532x32.2029x0.45	1222.33	2291.67	0.533	0.00	2291.67	0.000
L20	47.5 - 40.75 (20)	TP33.966x32.9532x0.45	1275.35	2345.23	0.544	0.00	2345.23	0.000
L21	40.75 - 40 (21)	TP33.5785x32.8283x0.4813	1382.78	2539.47	0.545	0.00	2539.47	0.000
L22	40 - 35 (22)	TP34.3287x33.5785x0.4688	1491.87	2590.61	0.576	0.00	2590.61	0.000
L23	35 - 30 (23)	TP35.0789x34.3287x0.4688	1602.33	2707.47	0.592	0.00	2707.47	0.000
L24	30 - 26.25 (24)	TP35.6415x35.0789x0.4688	1686.04	2796.82	0.603	0.00	2796.82	0.000
L25	26.25 - 26 (25)	TP35.679x35.6415x0.5188	1691.65	3088.59	0.548	0.00	3088.59	0.000
L26	26 - 21 (26)	TP36.4292x35.679x0.5063	1804.42	3148.41	0.573	0.00	3148.41	0.000
L27	21 - 16 (27)	TP37.1794x36.4292x0.5063	1918.37	3282.21	0.584	0.00	3282.21	0.000
L28	16 - 11 (28)	TP37.9296x37.1794x0.4938	2033.38	3337.72	0.609	0.00	3337.72	0.000
L29	11 - 6 (29)	TP38.6798x37.9296x0.4938	2149.36	3473.72	0.619	0.00	3473.72	0.000
L30	6 - 1 (30)	TP39.43x38.6798x0.4875	2266.28	3568.43	0.635	0.00	3568.43	0.000
L31	1 - 0 (31)	TP39.58x39.43x0.4875	2289.78	3596.15	0.637	0.00	3596.15	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	133 - 128 (1)	TP14x14x0.375	2.60	182.03	0.014	0.09	218.04	0.000
L2	128 - 123 (2)	TP14x14x0.375	2.81	182.03	0.015	0.09	218.04	0.000
L3	123 - 118 (3)	TP22.7502x22x0.1875	7.78	216.08	0.036	0.15	429.82	0.000
L4	118 - 113 (4)	TP23.5004x22.7502x0.1875	8.14	223.31	0.036	0.15	458.88	0.000
L5	113 - 108 (5)	TP24.2506x23.5004x0.1875	11.88	230.55	0.052	0.15	488.88	0.000
L6	108 - 103 (6)	TP25.0007x24.2506x0.1875	12.23	237.78	0.051	0.15	519.84	0.000
L7	103 - 98 (7)	TP25.7509x25.0007x0.1875	12.57	246.46	0.051	0.15	551.75	0.000
L8	98 - 93 (8)	TP26.5011x25.7509x0.1875	12.90	253.69	0.051	0.15	584.61	0.000
L9	93 - 88 (9)	TP27.2513x26.5011x0.1875	18.29	260.92	0.070	0.30	618.42	0.000
L10	88 - 82.25 (10)	TP28.114x27.2513x0.1875	18.42	264.18	0.070	0.30	633.94	0.000
L11	82.25 - 80.75 (11)	TP27.9641x27.2139x0.25	18.79	385.94	0.049	0.30	936.71	0.000
L12	80.75 - 75.75 (12)	TP28.7143x27.9641x0.25	19.09	396.39	0.048	0.30	988.12	0.000
L13	75.75 - 70.75 (13)	TP29.4646x28.7143x0.25	19.74	406.84	0.049	0.30	1040.88	0.000
L14	70.75 - 65.75 (14)	TP30.2148x29.4646x0.25	20.01	417.29	0.048	0.30	1095.03	0.000
L15	65.75 - 60.75 (15)	TP30.9651x30.2148x0.25	20.28	427.74	0.047	0.59	1150.55	0.001
L16	60.75 - 57.75 (16)	TP31.4152x30.9651x0.25	20.43	434.00	0.047	0.59	1184.53	0.000
L17	57.75 - 57.5 (17)	TP31.4527x31.4152x0.4625	20.43	798.40	0.026	0.59	2166.83	0.000
L18	57.5 - 52.5 (18)	TP32.2029x31.4527x0.4563	20.77	806.84	0.026	0.59	2243.18	0.000
L19	52.5 - 47.5 (19)	TP32.9532x32.2029x0.45	21.13	814.75	0.026	0.73	2319.15	0.000
L20	47.5 - 40.75 (20)	TP33.966x32.9532x0.45	21.29	824.15	0.026	0.73	2372.98	0.000
L21	40.75 - 40 (21)	TP33.5785x32.8283x0.4813	21.68	887.25	0.024	0.73	2571.69	0.000
L22	40 - 35 (22)	TP34.3287x33.5785x0.4688	21.97	884.12	0.025	0.73	2621.67	0.000
L23	35 - 30 (23)	TP35.0789x34.3287x0.4688	22.24	903.71	0.025	0.73	2739.13	0.000
L24	30 - 26.25 (24)	TP35.6415x35.0789x0.4688	22.43	918.40	0.024	0.73	2828.90	0.000
L25	26.25 - 26 (25)	TP35.679x35.6415x0.5188	22.43	1016.00	0.022	0.73	3128.43	0.000
L26	26 - 21 (26)	TP36.4292x35.679x0.5063	22.69	1013.03	0.022	0.73	3186.93	0.000
L27	21 - 16 (27)	TP37.1794x36.4292x0.5063	22.91	1034.18	0.022	0.73	3321.43	0.000
L28	16 - 11 (28)	TP37.9296x37.1794x0.4938	23.11	1029.62	0.022	0.73	3375.57	0.000
L29	11 - 6 (29)	TP38.6798x37.9296x0.4938	23.31	1050.26	0.022	0.73	3512.21	0.000
L30	6 - 1 (30)	TP39.43x38.6798x0.4875	23.49	1057.50	0.022	0.73	3606.50	0.000
L31	1 - 0 (31)	TP39.58x39.43x0.4875	23.53	1061.58	0.022	0.73	3634.34	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	133 - 128 (1)	0.002	0.046	0.000	0.014	0.000	0.049	1.050	4.8.2
L2	128 - 123 (2)	0.003	0.108	0.000	0.015	0.000	0.111	1.050	4.8.2
L3	123 - 118 (3)	0.009	0.126	0.000	0.036	0.000	0.135	1.050	4.8.2
L4	118 - 113 (4)	0.009	0.212	0.000	0.036	0.000	0.222	1.050	4.8.2
L5	113 - 108 (5)	0.013	0.316	0.000	0.052	0.000	0.331	1.050	4.8.2
L6	108 - 103 (6)	0.013	0.427	0.000	0.051	0.000	0.442	1.050	4.8.2
L7	103 - 98 (7)	0.013	0.530	0.000	0.051	0.000	0.546	1.050	4.8.2
L8	98 - 93 (8)	0.013	0.627	0.000	0.051	0.000	0.643	1.050	4.8.2
L9	93 - 88 (9)	0.019	0.770	0.000	0.070	0.000	0.794	1.050	4.8.2
L10	88 - 82.25 (10)	0.019	0.829	0.000	0.070	0.000	0.852	1.050	4.8.2
L11	82.25 - 80.75 (11)	0.014	0.623	0.000	0.049	0.000	0.639	1.050	4.8.2
L12	80.75 - 75.75 (12)	0.014	0.696	0.000	0.048	0.000	0.712	1.050	4.8.2
L13	75.75 - 70.75 (13)	0.014	0.766	0.000	0.049	0.000	0.782	1.050	4.8.2
L14	70.75 - 65.75 (14)	0.014	0.831	0.000	0.048	0.000	0.847	1.050	4.8.2
L15	65.75 - 60.75 (15)	0.014	0.892	0.000	0.047	0.001	0.908	1.050	4.8.2
L16	60.75 - 57.75 (16)	0.015	0.926	0.000	0.047	0.000	0.943	1.050	4.8.2
L17	57.75 - 57.5 (17)	0.008	0.474	0.000	0.026	0.000	0.483	1.050	4.8.2
L18	57.5 - 52.5 (18)	0.008	0.504	0.000	0.026	0.000	0.513	1.050	4.8.2
L19	52.5 - 47.5 (19)	0.009	0.533	0.000	0.026	0.000	0.543	1.050	4.8.2
L20	47.5 - 40.75 (20)	0.009	0.544	0.000	0.026	0.000	0.553	1.050	4.8.2
L21	40.75 - 40 (21)	0.009	0.545	0.000	0.024	0.000	0.554	1.050	4.8.2
L22	40 - 35 (22)	0.009	0.576	0.000	0.025	0.000	0.586	1.050	4.8.2
L23	35 - 30 (23)	0.009	0.592	0.000	0.025	0.000	0.602	1.050	4.8.2
L24	30 - 26.25 (24)	0.010	0.603	0.000	0.024	0.000	0.613	1.050	4.8.2
L25	26.25 - 26 (25)	0.009	0.548	0.000	0.022	0.000	0.557	1.050	4.8.2
L26	26 - 21 (26)	0.009	0.573	0.000	0.022	0.000	0.583	1.050	4.8.2
L27	21 - 16 (27)	0.009	0.584	0.000	0.022	0.000	0.594	1.050	4.8.2
L28	16 - 11 (28)	0.010	0.609	0.000	0.022	0.000	0.620	1.050	4.8.2
L29	11 - 6 (29)	0.010	0.619	0.000	0.022	0.000	0.629	1.050	4.8.2
L30	6 - 1 (30)	0.010	0.635	0.000	0.022	0.000	0.646	1.050	4.8.2
L31	1 - 0 (31)	0.010	0.637	0.000	0.022	0.000	0.648	1.050	4.8.2

Section Capacity Table

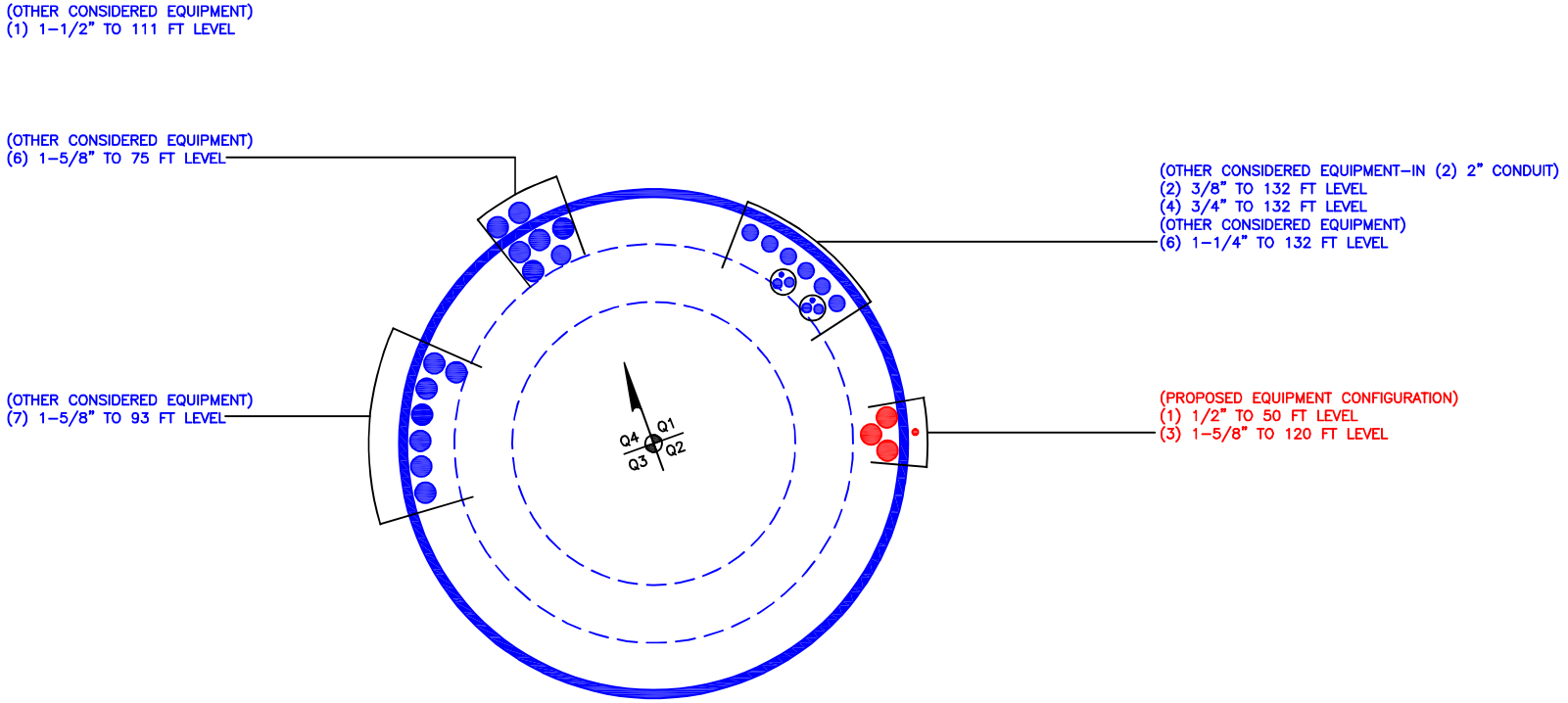
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	133 - 128	Pole	TP14x14x0.375	1	-1.23	637.09	4.6	Pass
L2	128 - 123	Pole	TP14x14x0.375	2	-1.58	637.09	10.6	Pass
L3	123 - 118	Pole	TP22.7502x22x0.1875	3	-6.25	761.35	12.9	Pass
L4	118 - 113	Pole	TP23.5004x22.7502x0.1875	4	-6.60	786.66	21.1	Pass
L5	113 - 108	Pole	TP24.2506x23.5004x0.1875	5	-9.83	811.97	31.5	Pass
L6	108 - 103	Pole	TP25.0007x24.2506x0.1875	6	-10.24	837.29	42.1	Pass
L7	103 - 98	Pole	TP25.7509x25.0007x0.1875	7	-10.67	862.60	52.0	Pass
L8	98 - 93	Pole	TP26.5011x25.7509x0.1875	8	-11.13	887.92	61.3	Pass
L9	93 - 88	Pole	TP27.2513x26.5011x0.1875	9	-16.29	913.23	75.6	Pass
L10	88 - 82.25	Pole	TP28.114x27.2513x0.1875	10	-16.55	924.62	81.2	Pass
L11	82.25 - 80.75	Pole	TP27.9641x27.2139x0.25	11	-17.42	1350.80	60.8	Pass
L12	80.75 - 75.75	Pole	TP28.7143x27.9641x0.25	12	-18.13	1387.38	67.8	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
L13	75.75 - 70.75	Pole	TP29.4646x28.7143x0.25	13	-19.04	1423.94	74.5	Pass
L14	70.75 - 65.75	Pole	TP30.2148x29.4646x0.25	14	-19.82	1460.51	80.7	Pass
L15	65.75 - 60.75	Pole	TP30.9651x30.2148x0.25	15	-20.62	1497.08	86.5	Pass
L16	60.75 - 57.75	Pole	TP31.4152x30.9651x0.25	16	-21.11	1519.01	89.8	Pass
L17	57.75 - 57.5	Pole	TP31.4527x31.4152x0.4625	17	-21.18	2794.40	46.0	Pass
L18	57.5 - 52.5	Pole	TP32.2029x31.4527x0.4563	18	-22.31	2823.92	48.9	Pass
L19	52.5 - 47.5	Pole	TP32.9532x32.2029x0.45	19	-23.49	2851.61	51.7	Pass
L20	47.5 - 40.75	Pole	TP33.966x32.9532x0.45	20	-24.08	2884.52	52.7	Pass
L21	40.75 - 40	Pole	TP33.5785x32.8283x0.4813	21	-26.05	3105.37	52.8	Pass
L22	40 - 35	Pole	TP34.3287x33.5785x0.4688	22	-27.30	3094.42	55.8	Pass
L23	35 - 30	Pole	TP35.0789x34.3287x0.4688	23	-28.58	3162.98	57.3	Pass
L24	30 - 26.25	Pole	TP35.6415x35.0789x0.4688	24	-29.54	3214.40	58.4	Pass
L25	26.25 - 26	Pole	TP35.679x35.6415x0.5188	25	-29.62	3556.00	53.0	Pass
L26	26 - 21	Pole	TP36.4292x35.679x0.5063	26	-31.01	3545.60	55.5	Pass
L27	21 - 16	Pole	TP37.1794x36.4292x0.5063	27	-32.42	3619.64	56.6	Pass
L28	16 - 11	Pole	TP37.9296x37.1794x0.4938	28	-33.84	3603.68	59.0	Pass
L29	11 - 6	Pole	TP38.6798x37.9296x0.4938	29	-35.21	3675.90	59.9	Pass
L30	6 - 1	Pole	TP39.43x38.6798x0.4875	30	-36.49	3701.26	61.5	Pass
L31	1 - 0	Pole	TP39.58x39.43x0.4875	31	-36.75	3715.53	61.7	Pass
							Summary	
						Pole (L16)	89.8	Pass
						RATING =	**89.8**	**Pass**

***NOTE: Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876382 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- H

Site BU: 876382

Work Order: 2131444

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	133	10	0	0	14	14	0.375		A500-42
2	123	40.75	3.5	18	22.00	28.114	0.1875	Auto	A607-60
3	85.75	45	4.25	18	27.21	33.966	0.25	Auto	A607-65
4	45	45	0	18	32.83	39.58	0.28125	Auto	A607-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	26.25	plate	PL 6.125x1.25	3			M2						M2						M2			
2	26.25	57.75	plate	PL 4.875x1.25	3			M2						M2						M2			
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in2)	Bolt Hole Size (in)	Reinforcement Material
1	6.125	1.25	7.65625	0.625	Welded	n/a	PC 8.8 - M20 (100)	27.000	15.000	6.094	1.1875	A572-65
2	4.875	1.25	6.09375	0.625	PC 8.8 - M20 (100)	27	PC 8.8 - M20 (100)	21.000	18.000	4.531	1.1875	A572-65

Connection Details for Custom Reinforcements

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)
PL 6.125x1.25	Top	9	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	-	-	-	-	70	CJP Groove	6.125	1.25	45	0.25	-	-	-
PL 4.875x1.25	Top	7	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	9	N	3	3	-	-	-	-	-	-	-	-	-

TNX Geometry Input

Increment (ft): 5 Export to TNX

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	133 - 128	5		0	14.000	14.000	0.375	A500-42	1.000
2	128 - 123	5	0	0	14.000	14.000	0.375	A500-42	1.000
3	123 - 118	5		18	22.000	22.750	0.1875	A607-60	1.000
4	118 - 113	5		18	22.750	23.500	0.1875	A607-60	1.000
5	113 - 108	5		18	23.500	24.251	0.1875	A607-60	1.000
6	108 - 103	5		18	24.251	25.001	0.1875	A607-60	1.000
7	103 - 98	5		18	25.001	25.751	0.1875	A607-60	1.000
8	98 - 93	5		18	25.751	26.501	0.1875	A607-60	1.000
9	93 - 88	5		18	26.501	27.251	0.1875	A607-60	1.000
10	88 - 85.75	5.75	3.5	18	27.251	28.114	0.1875	A607-60	1.000
11	85.75 - 80.75	5		18	27.214	27.964	0.25	A607-65	1.000
12	80.75 - 75.75	5		18	27.964	28.714	0.25	A607-65	1.000
13	75.75 - 70.75	5		18	28.714	29.465	0.25	A607-65	1.000
14	70.75 - 65.75	5		18	29.465	30.215	0.25	A607-65	1.000
15	65.75 - 60.75	5		18	30.215	30.965	0.25	A607-65	1.000
16	60.75 - 57.75	3		18	30.965	31.415	0.25	A607-65	1.000
17	57.75 - 57.5	0.25		18	31.415	31.453	0.4625	A607-65	0.946
18	57.5 - 52.5	5		18	31.453	32.203	0.45625	A607-65	0.949
19	52.5 - 47.5	5		18	32.203	32.953	0.45	A607-65	0.953
20	47.5 - 45	6.75	4.25	18	32.953	33.966	0.45	A607-65	0.948
21	45 - 40	5		18	32.828	33.578	0.48125	A607-65	0.950
22	40 - 35	5		18	33.578	34.329	0.46875	A607-65	0.966
23	35 - 30	5		18	34.329	35.079	0.46875	A607-65	0.958
24	30 - 26.25	3.75		18	35.079	35.642	0.46875	A607-65	0.953
25	26.25 - 26	0.25		18	35.642	35.679	0.51875	A607-65	0.943
26	26 - 21	5		18	35.679	36.429	0.50625	A607-65	0.957
27	21 - 16	5		18	36.429	37.179	0.50625	A607-65	0.949
28	16 - 11	5		18	37.179	37.930	0.49375	A607-65	0.964
29	11 - 6	5		18	37.930	38.680	0.49375	A607-65	0.957
30	6 - 1	5		18	38.680	39.430	0.4875	A607-65	0.961
31	1 - 0	1		18	39.430	39.580	0.4875	A607-65	0.960

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	133 - 128	1.23	10.20	2.60
2	128 - 123	1.58	23.73	2.81
3	123 - 118	6.25	50.83	7.78
4	118 - 113	6.60	90.62	8.14
5	113 - 108	9.83	142.48	11.88
6	108 - 103	10.24	202.73	12.23
7	103 - 98	10.67	264.70	12.57
8	98 - 93	11.13	328.35	12.90
9	93 - 88	16.29	421.78	18.29
10	88 - 85.75	16.55	463.06	18.42
11	85.75 - 80.75	17.42	556.09	18.79
12	80.75 - 75.75	18.13	650.73	19.09
13	75.75 - 70.75	19.04	748.37	19.74
14	70.75 - 65.75	19.82	847.68	20.01
15	65.75 - 60.75	20.62	948.32	20.27
16	60.75 - 57.75	21.11	1009.33	20.43
17	57.75 - 57.5	21.18	1014.44	20.43
18	57.5 - 52.5	22.31	1117.43	20.77
19	52.5 - 47.5	23.49	1222.34	21.13
20	47.5 - 45	24.08	1275.35	21.29
21	45 - 40	26.05	1382.78	21.68
22	40 - 35	27.30	1491.87	21.97
23	35 - 30	28.58	1602.34	22.24
24	30 - 26.25	29.54	1686.04	22.43
25	26.25 - 26	29.62	1691.65	22.43
26	26 - 21	31.01	1804.42	22.69
27	21 - 16	32.42	1918.37	22.91
28	16 - 11	33.84	2033.38	23.11
29	11 - 6	35.21	2149.36	23.31
30	6 - 1	36.49	2266.28	23.49
31	1 - 0	36.75	2289.77	23.53

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
133 - 128	Pole	TP14x14x0.375	Pole	4.6%	Pass
128 - 123	Pole	TP14x14x0.375	Pole	10.6%	Pass
123 - 118	Pole	TP22.75x22x0.1875	Pole	12.9%	Pass
118 - 113	Pole	TP23.5x22.75x0.1875	Pole	21.1%	Pass
113 - 108	Pole	TP24.251x23.5x0.1875	Pole	31.5%	Pass
108 - 103	Pole	TP25.001x24.251x0.1875	Pole	42.1%	Pass
103 - 98	Pole	TP25.751x25.001x0.1875	Pole	52.0%	Pass
98 - 93	Pole	TP26.501x25.751x0.1875	Pole	61.3%	Pass
93 - 88	Pole	TP27.251x26.501x0.1875	Pole	75.6%	Pass
88 - 85.75	Pole	TP28.114x27.251x0.1875	Pole	81.2%	Pass
85.75 - 80.75	Pole	TP27.964x27.214x0.25	Pole	60.8%	Pass
80.75 - 75.75	Pole	TP28.714x27.964x0.25	Pole	67.8%	Pass
75.75 - 70.75	Pole	TP29.465x28.714x0.25	Pole	74.5%	Pass
70.75 - 65.75	Pole	TP30.215x29.465x0.25	Pole	80.7%	Pass
65.75 - 60.75	Pole	TP30.965x30.215x0.25	Pole	86.5%	Pass
60.75 - 57.75	Pole	TP31.415x30.965x0.25	Pole	89.8%	Pass
57.75 - 57.5	Pole + Reinf.	TP31.453x31.415x0.4625	Reinf. 2 Tension Rupture	78.0%	Pass
57.5 - 52.5	Pole + Reinf.	TP32.203x31.453x0.4563	Reinf. 2 Tension Rupture	82.8%	Pass
52.5 - 47.5	Pole + Reinf.	TP32.953x32.203x0.45	Reinf. 2 Tension Rupture	87.4%	Pass
47.5 - 45	Pole + Reinf.	TP33.966x32.953x0.45	Reinf. 2 Tension Rupture	89.5%	Pass
45 - 40	Pole + Reinf.	TP33.578x32.828x0.4813	Reinf. 2 Tension Rupture	89.7%	Pass
40 - 35	Pole + Reinf.	TP34.329x33.578x0.4688	Reinf. 2 Tension Rupture	93.4%	Pass
35 - 30	Pole + Reinf.	TP35.079x34.329x0.4688	Reinf. 2 Tension Rupture	96.8%	Pass
30 - 26.25	Pole + Reinf.	TP35.642x35.079x0.4688	Reinf. 2 Tension Rupture	99.2%	Pass
26.25 - 26	Pole + Reinf.	TP35.679x35.642x0.5188	Reinf. 1 Tension Rupture	84.4%	Pass
26 - 21	Pole + Reinf.	TP36.429x35.679x0.5063	Reinf. 1 Tension Rupture	87.2%	Pass
21 - 16	Pole + Reinf.	TP37.179x36.429x0.5063	Reinf. 1 Tension Rupture	89.8%	Pass
16 - 11	Pole + Reinf.	TP37.93x37.179x0.4938	Reinf. 1 Tension Rupture	92.2%	Pass
11 - 6	Pole + Reinf.	TP38.68x37.93x0.4938	Reinf. 1 Tension Rupture	94.5%	Pass
6 - 1	Pole + Reinf.	TP39.43x38.68x0.4875	Reinf. 1 Tension Rupture	96.6%	Pass
1 - 0	Pole + Reinf.	TP39.58x39.43x0.4875	Reinf. 1 Tension Rupture	97.0%	Pass
				Summary	
			Pole	89.8%	Pass
			Reinforcement	99.2%	Pass
			Overall	99.2%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*		
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2
133 - 128	373	n/a	373	16.05	n/a	16.05	4.6%		
128 - 123	373	n/a	373	16.05	n/a	16.05	10.6%		
123 - 118	863	n/a	863	13.43	n/a	13.43	12.9%		
118 - 113	952	n/a	952	13.87	n/a	13.87	21.1%		
113 - 108	1047	n/a	1047	14.32	n/a	14.32	31.5%		
108 - 103	1148	n/a	1148	14.77	n/a	14.77	42.1%		
103 - 98	1256	n/a	1256	15.21	n/a	15.21	52.0%		
98 - 93	1369	n/a	1369	15.66	n/a	15.66	61.3%		
93 - 88	1490	n/a	1490	16.11	n/a	16.11	75.6%		
88 - 85.75	1546	n/a	1546	16.31	n/a	16.31	81.2%		
85.75 - 80.75	2133	n/a	2133	21.99	n/a	21.99	60.8%		
80.75 - 75.75	2311	n/a	2311	22.59	n/a	22.59	67.8%		
75.75 - 70.75	2499	n/a	2499	23.18	n/a	23.18	74.5%		
70.75 - 65.75	2696	n/a	2696	23.78	n/a	23.78	80.7%		
65.75 - 60.75	2904	n/a	2904	24.37	n/a	24.37	86.5%		
60.75 - 57.75	3033	n/a	3033	24.73	n/a	24.73	89.8%		
57.75 - 57.5	3044	2463	5508	24.76	18.28	43.04	49.1%		78.0%
57.5 - 52.5	3269	2577	5846	25.35	18.28	43.63	52.5%		82.8%
52.5 - 47.5	3505	2693	6198	25.95	18.28	44.23	55.9%		87.4%
47.5 - 45	3627	2752	6379	26.25	18.28	44.53	57.5%		89.5%
45 - 40	4162	2791	6953	29.72	18.28	48.00	55.6%		89.7%
40 - 35	4450	2912	7362	30.39	18.28	48.67	58.3%		93.4%
35 - 30	4750	3035	7786	31.06	18.28	49.34	60.9%		96.8%
30 - 26.25	4985	3129	8114	31.56	18.28	49.85	62.8%		99.2%
26.25 - 26	5000	3953	8953	31.60	22.97	54.57	57.2%	84.4%	
26 - 21	5325	4114	9439	32.27	22.97	55.24	59.5%	87.2%	
21 - 16	5664	4277	9941	32.94	22.97	55.91	61.7%	89.8%	
16 - 11	6016	4445	10461	33.61	22.97	56.58	63.9%	92.2%	
11 - 6	6383	4615	10998	34.28	22.97	57.25	66.0%	94.5%	
6 - 1	6764	4789	11553	34.95	22.97	57.92	68.0%	96.6%	
1 - 0	6843	4824	11666	35.08	22.97	58.05	68.4%	97.0%	

Note: Section capacity checked using 5 degree increments.
Rating per TIA-222-H Section 15.5.

Monopole Flange Plate Connection

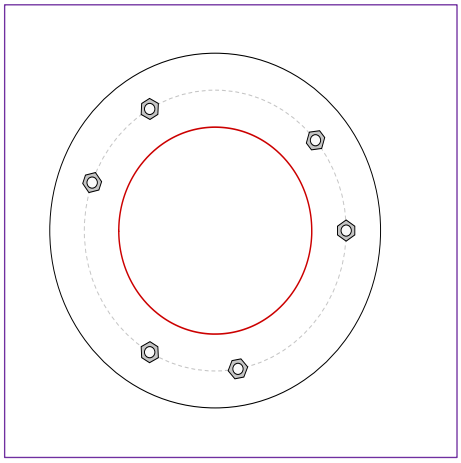
Elevation = 123 ft.

BU #	876382
Site Name	Berlin / Laviana Orchard
Order #	621160 Rev. 1
TIA-222 Revision	H

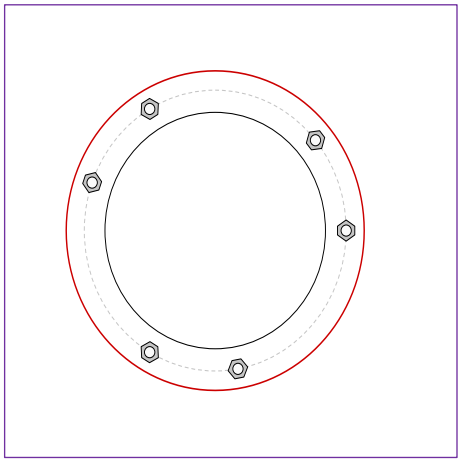
Applied Loads	
Moment (kip-ft)	23.73
Axial Force (kips)	1.58
Shear Force (kips)	2.81

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(6) 3/4" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 19" BC

Top Plate Data

24" OD x 1.5" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

16" ID x 0.75" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

14" x 0.375" round pole (A500-42; Fy=42 ksi, Fu=58 ksi)

Bottom Pole Data

22" x 0.1875" 18-sided pole (A607-60; Fy=60 ksi, Fu=75 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	9.72	
Allowable (kips)	30.05	
Stress Rating:	**30.8%**	Pass

Top Plate Capacity

Max Stress (ksi):	5.15	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**15.1%**	Pass
Tension Side Stress Rating:	**7.5%**	Pass

Bottom Plate Capacity

Max Stress (ksi):	15.94	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**46.9%**	Pass
Tension Side Stress Rating:	**N/A**	

CCIplate

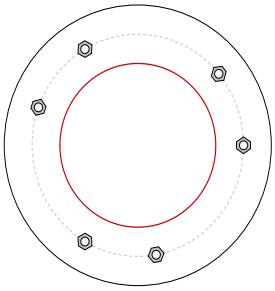
Elevation (ft)	123	*(Flange)*

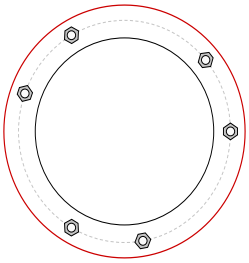
Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending
1	Yes	Yes	Yes

Custom Bolt Connection

Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, η:	l_{ar} (in):	Thread Type	Area Override, in^2	Tension Only
1	1	0	0.75	A325	19	0.5	0	N-Included		No
2	1	40	0.75	A325	19	0.5	0	N-Included		No
3	1	120	0.75	A325	19	0.5	0	N-Included		No
4	1	160	0.75	A325	19	0.5	0	N-Included		No
5	1	240	0.75	A325	19	0.5	0	N-Included		No
6	1	280	0.75	A325	19	0.5	0	N-Included		No

Plot Graphic





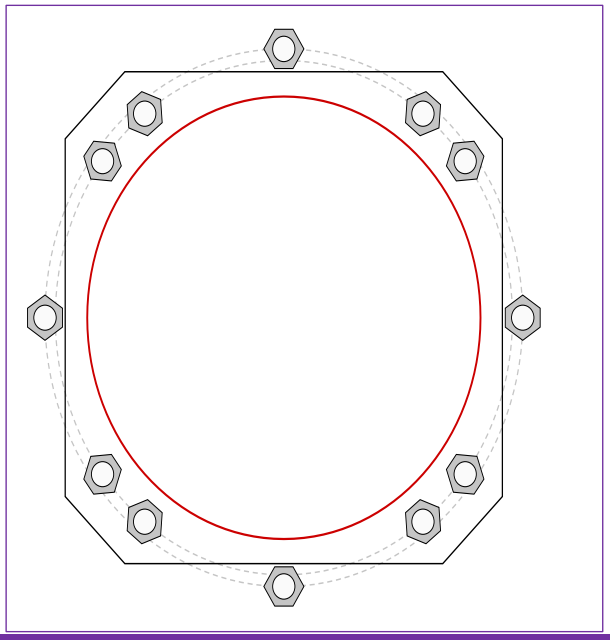
Monopole Base Plate Connection

Site Info	
BU #	876382
Site Name	Berlin / Laviana Orchar
Order #	621160 Rev. 1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	See Custom Sheet
l_{ar} (in)	See Custom Sheet

Applied Loads	
Moment (kip-ft)	2289.77
Axial Force (kips)	36.75
Shear Force (kips)	23.53

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (8) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 46" BC

Anchor Spacing: 6 in

GROUP 2: (4) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 48.08" BC

Base Plate Data

44" W x 2.75" Plate (A572-55; Fy=55 ksi, Fu=70 ksi); Clip: 6 in

Stiffener Data

N/A

Pole Data

39.58" x 0.2813" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

GROUP 1:		
Pu_t = 188.2	ϕPn_t = 243.75	**Stress Rating**
Vu = 2.94	ϕVn = 149.1	**73.5%**
Mu = n/a	ϕMn = n/a	**Pass**
GROUP 2:		
Pu_t = 201.7	ϕPn_t = 243.75	**Stress Rating**
Vu = 0	ϕVn = 149.1	**78.8%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	27.58	(Flexural)
Allowable Stress (ksi):	49.5	
Stress Rating:	**53.1%**	**Pass**

CCIplate

Elevation (ft)	0	*(Base)*

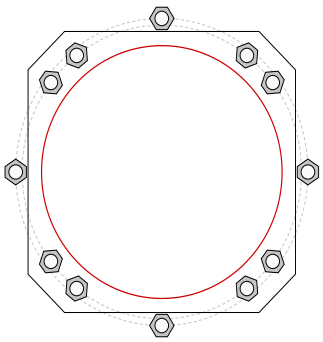
note: Bending interaction not considered when Grout Considered = "Yes"

Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending	Grout Considered	Apply at BARB Elevation	BARB CL Elevation (ft)
1	Yes	Yes	Yes	No	No	
2	No	No	No	No	No	

Custom Bolt Connection

Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, n:	l_{ar} (in):	Thread Type	Area Override, in^2	Tension Only
1	1	37.5052825	2.25	A615-75	46	0.5	1.75	N-Included		No
2	1	52.4947175	2.25	A615-75	46	0.5	1.75	N-Included		No
3	1	127.505283	2.25	A615-75	46	0.5	1.75	N-Included		No
4	1	142.494717	2.25	A615-75	46	0.5	1.75	N-Included		No
5	1	217.505283	2.25	A615-75	46	0.5	1.75	N-Included		No
6	1	232.494717	2.25	A615-75	46	0.5	1.75	N-Included		No
7	1	307.505283	2.25	A615-75	46	0.5	1.75	N-Included		No
8	1	322.494717	2.25	A615-75	46	0.5	1.75	N-Included		No
9	2	0	2.25	A615-75	48.08	0.5	1.75	N-Included		No
10	2	90	2.25	A615-75	48.08	0.5	1.75	N-Included		No
11	2	180	2.25	A615-75	48.08	0.5	1.75	N-Included		No
12	2	270	2.25	A615-75	48.08	0.5	1.75	N-Included		No

Plot Graphic



Drilled Pier Foundation

BU # :	876382
Site Name:	Berlin / Laviana Orchard
Order Number:	621160 Rev. 1
TIA-222 Revison:	H
Tower Type:	Monopole

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	☐
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

Go to Soil Calculations

Applied Loads	Comp.	Uplift
Moment (kip-ft)	2289.77	
Axial Force (kips)	36.77	
Shear Force (kips)	23.51	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	20	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 20' below grade		
Pier Diameter	6	ft
Rebar Quantity	16	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	
Tie Spacing	18	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	5.31	-
Soil Safety Factor	2.62	-
Max Moment (kip-ft)	2460.61	-
Rating*	*48.4%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	127.23	-
End Bearing (kips)	848.23	-
Weight of Concrete (kips)	93.74	-
Total Capacity (kips)	975.46	-
Axial (kips)	130.51	-
Rating*	*12.7%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	5.03	-
Critical Moment (kip-ft)	2459.93	-
Critical Moment Capacity	3350.53	-
Rating*	*69.9%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	14.85	-
Critical Shear (kip)	356.69	-
Critical Shear Capacity	427.23	-
Rating*	*79.5%*	-

Structural Foundation Rating*	**79.5%**
Soil Interaction Rating*	**48.4%**

*Rating per TIA-222-H Section 15.5

Soil Profile

Groundwater Depth	15

# of Layers	4

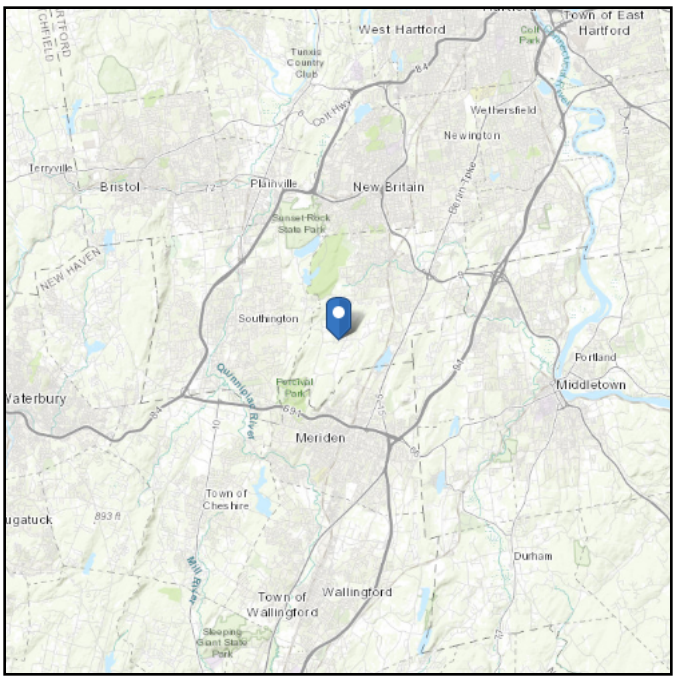
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.33	3.33	135	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.33	5	1.67	135	150	0	38	0.000	0.000	0.00	0.00			Cohesionless
3	5	15	10	135	150	0	38	0.000	0.000	0.60	0.60			Cohesionless
4	15	20	5	75	87.6	0	38	0.000	0.000	0.60	0.60	40		Cohesionless

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 345.04 ft (NAVD 88)
Latitude: 41.589742
Longitude: -72.805333



Wind

Results:

Wind Speed	118 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	98 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Mon Jun 27 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

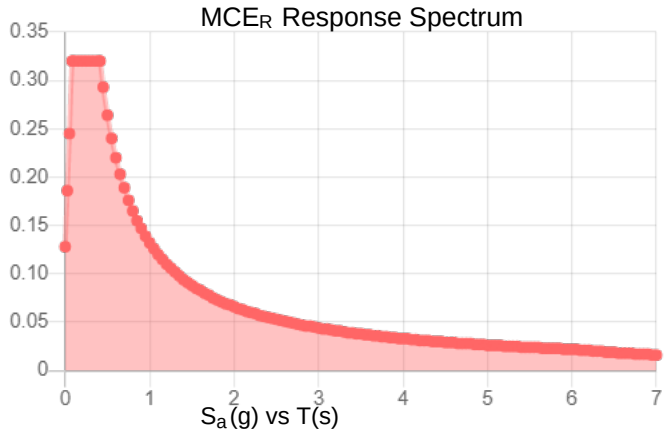
Seismic

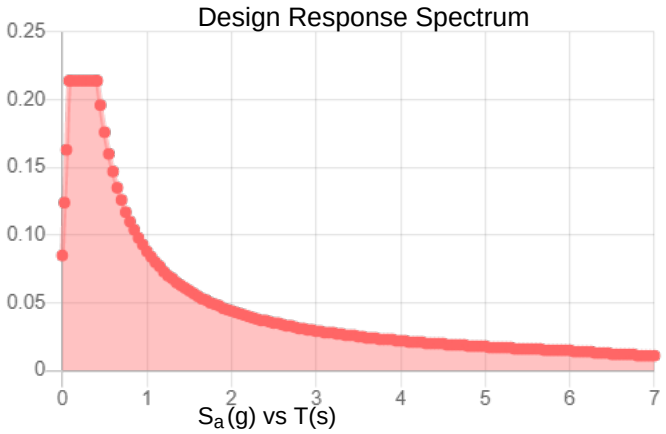
Site Soil Class: D - Stiff Soil

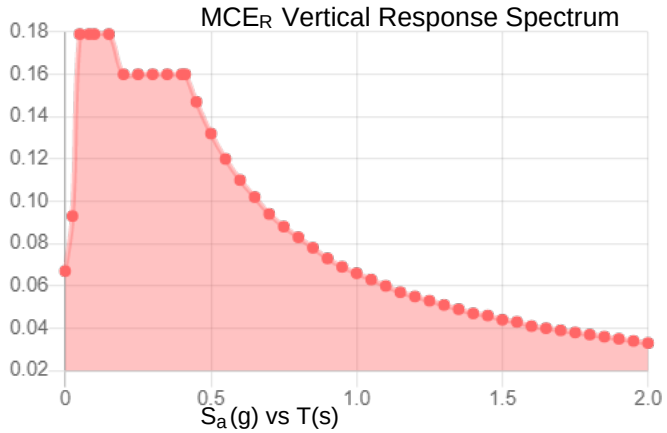
Results:

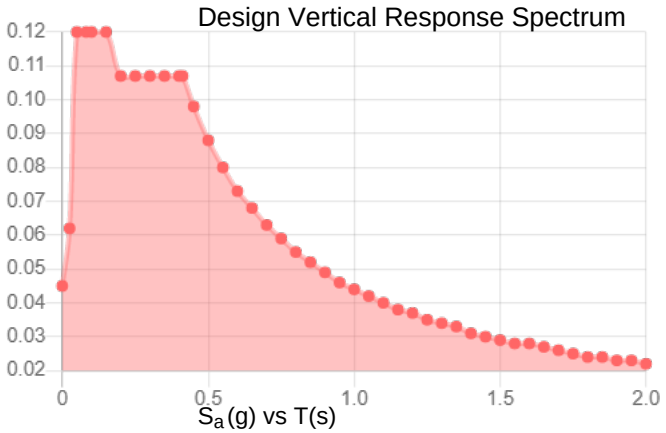
S_S :	0.2	S_{D1} :	0.088
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.11
F_v :	2.4	PGA_M :	0.174
S_{MS} :	0.32	F_{PGA} :	1.579
S_{M1} :	0.132	I_e :	1
S_{DS} :	0.214	C_v :	0.7

Seismic Design Category B









Data Accessed: **Mon Jun 27 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Mon Jun 27 2022

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Date: **June 14, 2022**

Infinigy
500 West Office Center Drive, Suite 150
Fort Washington, PA 19034
(518) 690-0790
structural@infinigy.com

Subject:	**Mount Analysis Report**	
Carrier Designation:	**T-Mobile Equipment Change-Our**	
	Carrier Site Number:	CT11604B
	Carrier Site Name:	Sprint Berlin Kensington
Crown Castle Designation:	**Crown Castle BU Number:**	876382
	Crown Castle Site Name:	BERLIN / LAVIANA ORCHARD
	Crown Castle JDE Job Number:	721118
	Crown Castle Order Number:	621160 Rev.0
Engineering Firm Designation:	**Infinigy Report Designation:**	1039-Z0001-B
Site Data:	**1684 Chamberlein Highway, Berlin, Hartford County, CT, 06037 Latitude 41°35'23.07" Longitude -72°48'19.20"**	
Structure Information:	**Tower Height & Type:**	**133.0 ft Monopole**
	Mount Elevation:	**120.0 ft**
	Mount Type:	**14.0 ft Platform**

Infinigy is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of T-Mobile's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform **Sufficient**

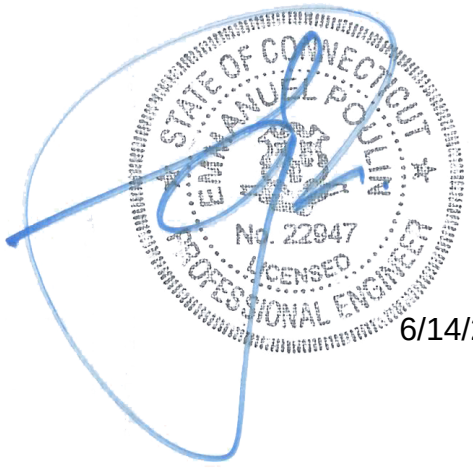
***See Section 4.1 of this report for the loading and structural modifications required in order for the mount to support the loading listed in Table 1.**

This analysis utilizes an ultimate 3-second gust wind speed of 118 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Alex Mercado, E.I.T.

Respectfully Submitted by: Emmanuel Poulin, P.E.

structural@infinigy.com



6/14/22

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA
Table 1 - Proposed Equipment Configuration

3) ANALYSIS PROCEDURE
Table 2 - Documents Provided
3.1) Analysis Method
3.2) Assumptions

4) ANALYSIS RESULTS
Table 3 - Mount Component Stresses vs. Capacity
4.1) Recommendations

5) APPENDIX A
Wire Frame and Rendered Models

6) APPENDIX B
Software Input Calculations

7) APPENDIX C
Software Analysis Output

8) APPENDIX D
Additional Calculations

9) APPENDIX E
Mount Modification Design Drawings (MDD) / Supplemental Drawings

1) INTRODUCTION

This is an existing 3 sector 14.0 ft Platform.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC / 2018 Connecticut State Building Code
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	118 mph
Exposure Category:	C
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.183
Seismic S_1:	0.063
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
120.0	121.0	3	COMMSCOPE	VV-65B-R1_TMO	14.0 ft Platform
		3	ERICSSON	AIR 6419 B41_TMO	
		3	RFS/CELWAVE	APXVAALL24_43-U-NA20_TMO	
		3	ERICSSON	RADIO 4460 B2/B25 B66_TMO	
		3	ERICSSON	RADIO 4480_TMOV2	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	T-Mobile Application	621160 Rev.0	CCI Sites
Previous Mount Analysis	Infingiy Engineering	9742207	CCI Sites
Loading Documents	T-Mobile	RFDS Version 7	TSA

3.1) Analysis Method

RISA-3D (Version 17.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

Infinigy Mount Analysis Tool V2.3, a tool internally developed by Infinigy, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B “Software Input Calculations”.

This analysis was performed in accordance with Crown Castle’s ENG-SOW-10208 *Mount Analysis* (Revision E).

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
5) Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Infinigy should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform, All Sectors)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,2,3	Mount Pipe(s)	MP9	120.0	62.3	Pass
	Horizontal(s)	MH1		86.5	Pass
	Standoff(s)	MS2		63.1	Pass
	Handrail(s)	HR1		48.6	Pass
	Handrail Corner Plate(s)	M46		62.2	Pass
	Mount Connection(s)	--		30.6	Pass

Structure Rating (max from all components) =	86.5%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in “Appendix D – Additional Calculations” for detailed mount connection calculations.
3) All sectors are typical

4.1) Recommendations

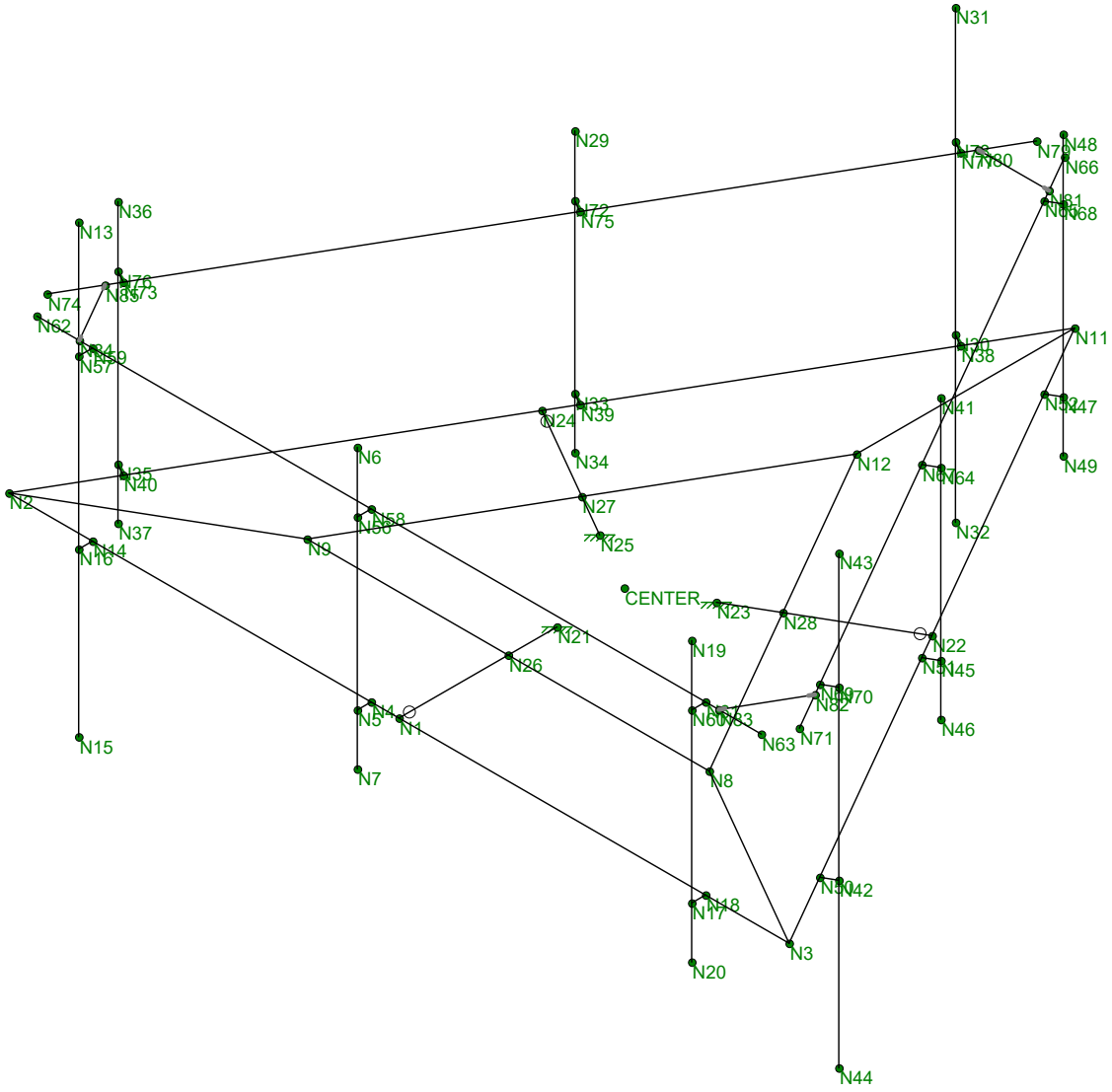
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the structural modifications listed below must be completed.

1. Installation of (1) Site Pro 1 AHCP Kit with (1) Site Pro 1 P30174 Bulk Pipe per sector. Trim proposed Site Pro 1 P30174 Bulk Pipes to 13’ long to fit existing platform.
2. Installation of (3) Site Pro 1 SCX2-K Crossover Plates per sector for connection between proposed handrail pipe and existing mount pipes.

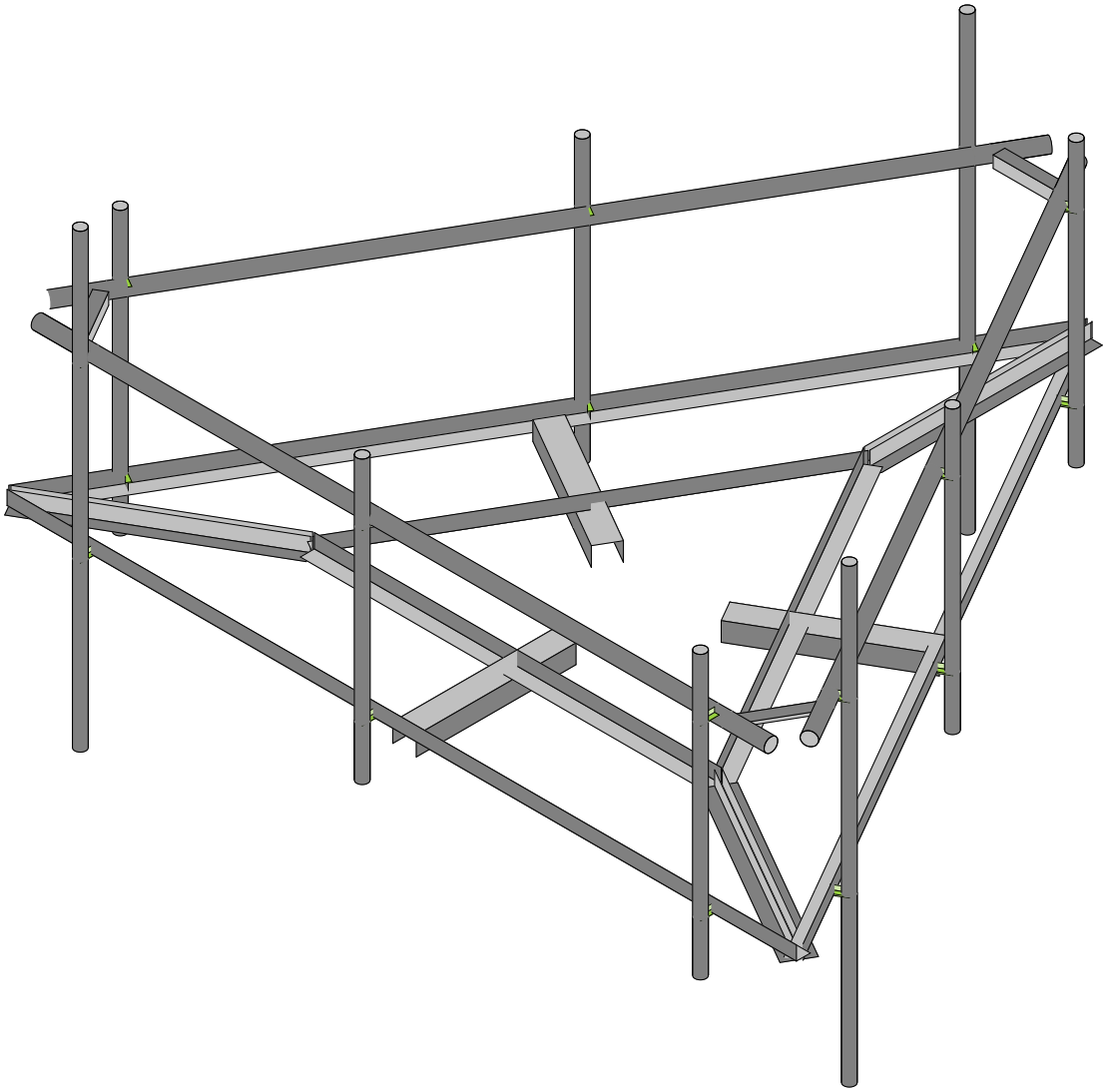
No structural modifications are required at this time, provided that the above-listed changes are implemented.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Infinigy Engineering	876382	Wireframe
AM		June 14, 2022 at 10:14 AM
1039-Z0001-B		876382_loaded.r3d



Infinigy Engineering	876382	Rendered
AM		June 14, 2022 at 10:15 AM
1039-Z0001-B		876382_loaded.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Program Inputs

INFINIGY

Infinigy Load Calculator V2.3

PROJECT INFORMATION	
Site Name:	ERLIN / LAVIANA ORCHAR
Carrier:	T-Mobile
Engineer:	Alex Mercado

SITE INFORMATION		
Risk Category:	II	
Exposure Category:	C	
Topo Factor Procedure:	Method 1, Category 1	
Site Class:	D - Stiff Soil (Assumed)	
Ground Elevation:	345.04	ft *Rev H

MOUNT INFORMATION		
Mount Type:	Platform	
Num Sectors:	3	
Centerline AGL:	120.00	ft
Tower Height AGL:	133.00	ft

TOPOGRAPHIC DATA		
Topo Feature:	N/A	
Slope Distance:	N/A	ft
Crest Distance:	N/A	ft
Crest Height:	N/A	ft

FACTORS		
Directionality Fact. (K_d):	0.950	
Ground Ele. Factor (K_e):	0.988	*Rev H Only
Rooftop Speed-Up (K_s):	1.000	*Rev H Only
Topographic Factor (K_{zt}):	1.000	
Height Esc. Fact. (K_{iz}):	1.138	
Gust Effect Factor (G_h):	1.000	
Shielding Factor (K_a):	0.900	
Velocity Pressure Co.(K_z):	1.315	(Mount Elev)

CODE STANDARDS		
Building Code:	2015 IBC	
TIA Standard:	TIA-222-H	
ASCE Standard:	ASCE 7-10	

WIND AND ICE DATA		
Ultimate Wind (V_{ult}):	118	mph
Design Wind (V):	N/A	mph
Ice Wind (V_{ice}):	50	mph
Base Ice Thickness (t_i):	1.5	in
Radial Ice Thickness (t_{iz}):	1.707	in
Flat Pressure:	87.964	psf
Round Pressure:	52.778	psf
Ice Wind Pressure:	9.476	psf

SEISMIC DATA		
Short-Period Accel. (S_s):	0.183	g
1-Second Accel. (S_1):	0.063	g
Short-Period Design (S_{DS}):	0.195	
1-Second Design (S_{D1}):	0.101	
Short-Period Coeff. (F_a):	1.600	
1-Second Coeff. (F_v):	2.400	
Amplification Factor (A_s):	3.000	
Response Mod. Coeff. (R):	2.000	
Seismic Importance (I_e):	1.000	
Seismic Response Co. (C_s):	0.098	
Total App. Weight:	478.070	lb
Total Shear Force (V_s):	46.660	lb
Hor. Seismic Load (E_h):	46.660	lb
Vert. Seismic Load (E_v):	18.664	lb *

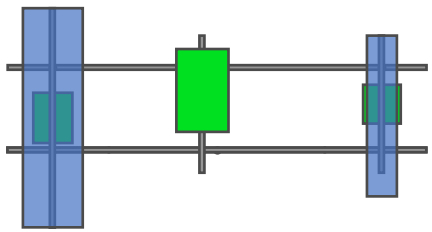
*For reference only. Per TIA rev H section 16.7, Ev is not applicable to mounts

Program Inputs

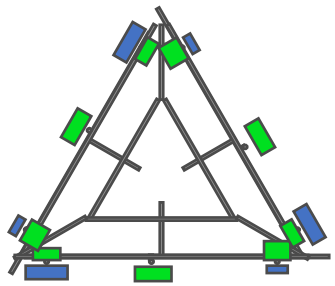
INFINIGY

Infinigy Load Calculator V2.3

ELEVATION VIEW



PLAN VIEW



APPURTENANCE INFORMATION

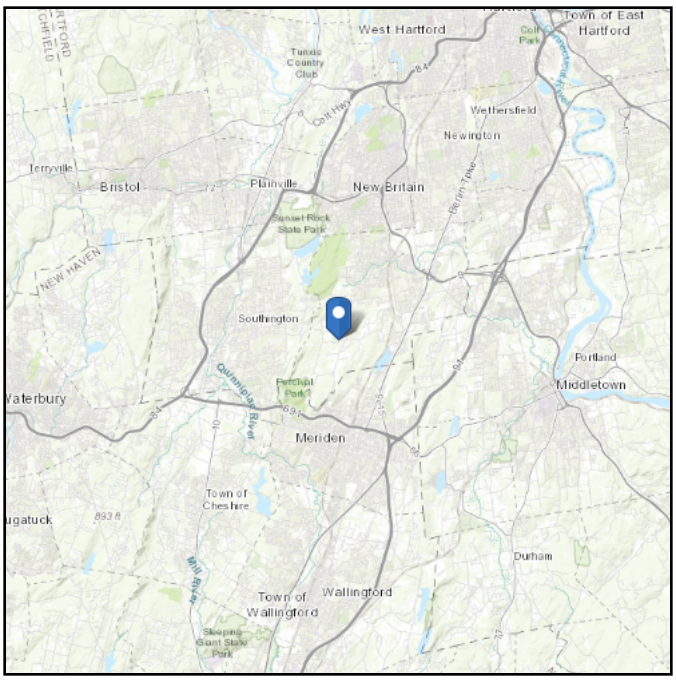
Appurtenance Name	Elevation	Qty.	Height (in)	Width (in)	Depth (in)	Weight (lbs)	EPA_N (ft^2)	EPA_T (ft^2)	Member (α sector)
COMMSCOPE VV-65B-R1_TMO	121.0	3	70.35	12.01	4.65	41.67	5.90	2.28	MP1
ERICSSON AIR 6419 B41_TMO	121.0	3	36.25	20.91	9.02	96.50	7.00	2.83	MP2
/CELWAVE APXVAALL24_43-U-NA20_TI	121.0	3	95.90	24.00	8.50	149.90	14.67	5.32	MP3
RICSSON RADIO 4460 B2/B25 B66_TMC	121.0	3	17.00	15.10	11.90	109.00	2.14	1.69	MP1
ERICSSON RADIO 4480_TMOV2	121.0	3	22.00	15.70	7.50	81.00	2.88	1.40	MP3

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 345.04 ft (NAVD 88)
Latitude: 41.589742
Longitude: -72.805333



Wind

Results:

Wind Speed	118 Vmph per the State of Connecticut allowing ASCE 7-16 wind speeds
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	93 Vmph
100-year MRI	100 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

Date Accessed: Tue Jun 14 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

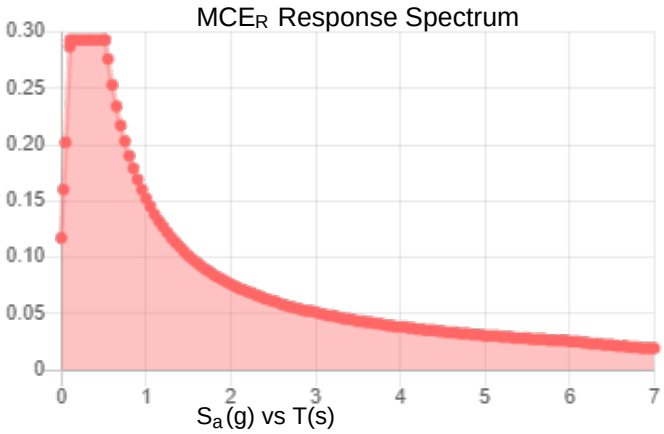
Seismic

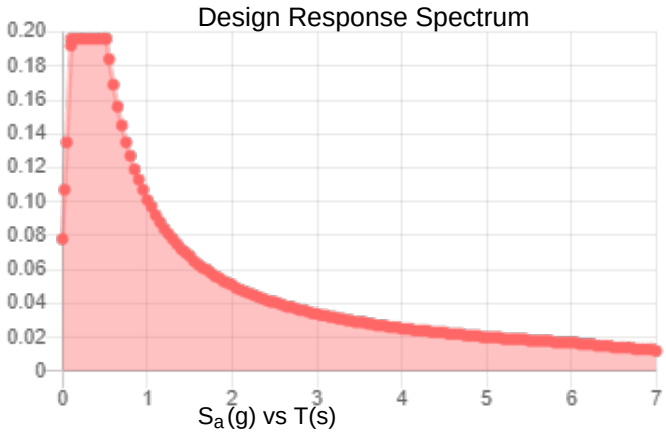
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.183	S_{DS} :	0.196
S_1 :	0.063	S_{D1} :	0.101
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.094
S_{MS} :	0.293	PGA_M :	0.15
S_{M1} :	0.152	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: **Tue Jun 14 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	5 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Jun 14 2022

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Ru...
1	MH1	N2	N3		270	Horizontals	Beam	Single Angle	A36 Gr.36	Typical
2	M2	N4	N5			RIGID	None	None	RIGID	Typical
3	MP2	N6	N7			Mount Pipe 2.0	Column	Pipe	A53 Gr.B	Typical
4	M4	N8	N3		180	Corner Horizontals	Beam	Double Angl...	A36 Gr.36	Typical
5	M5	N9	N2		180	Corner Horizontals	Beam	Double Angl...	A36 Gr.36	Typical
6	MH2	N8	N9		270	Horizontals	Beam	Single Angle	A36 Gr.36	Typical
7	MH3	N3	N11		270	Horizontals	Beam	Single Angle	A36 Gr.36	Typical
8	MH4	N11	N2		270	Horizontals	Beam	Single Angle	A36 Gr.36	Typical
9	MH5	N9	N12		270	Horizontals	Beam	Single Angle	A36 Gr.36	Typical
10	MH6	N12	N8		270	Horizontals	Beam	Single Angle	A36 Gr.36	Typical
11	M11	N12	N11		180	Corner Horizontals	Beam	Double Angl...	A36 Gr.36	Typical
12	M12	N14	N16			RIGID	None	None	RIGID	Typical
13	MP3	N13	N15			Mount Pipe 2.0	Column	Pipe	A53 Gr.B	Typical
14	MS3	N1	N21		90	Standoff 1	Beam	Channel	A36 Gr.36	Typical
15	M15	N18	N17			RIGID	None	None	RIGID	Typical
16	MP1	N19	N20			Mount Pipe 2.0	Column	Pipe	A53 Gr.B	Typical
17	MS1	N22	N23		90	Standoff 1	Beam	Channel	A36 Gr.36	Typical
18	MS2	N24	N25		90	Standoff 1	Beam	Channel	A36 Gr.36	Typical
19	M19	N38	N30			RIGID	None	None	RIGID	Typical
20	MP6	N31	N32			Mount Pipe 2.0	Column	Pipe	A53 Gr.B	Typical
21	M21	N39	N33			RIGID	None	None	RIGID	Typical
22	MP5	N29	N34			Mount Pipe 2.0	Column	Pipe	A53 Gr.B	Typical
23	M23	N40	N35			RIGID	None	None	RIGID	Typical
24	MP4	N36	N37			Mount Pipe 2.0	Column	Pipe	A53 Gr.B	Typical
25	M25	N50	N42			RIGID	None	None	RIGID	Typical
26	MP9	N43	N44			Mount Pipe 2.0	Column	Pipe	A53 Gr.B	Typical
27	M27	N51	N45			RIGID	None	None	RIGID	Typical
28	MP8	N41	N46			Mount Pipe 2.0	Column	Pipe	A53 Gr.B	Typical
29	M29	N52	N47			RIGID	None	None	RIGID	Typical
30	MP7	N48	N49			Mount Pipe 2.0	Column	Pipe	A53 Gr.B	Typical
31	HR1	N62	N63		270	Handrail	Beam	Pipe	A53 Gr.B	Typical
32	M32	N58	N56			RIGID	None	None	RIGID	Typical
33	M33	N59	N57			RIGID	None	None	RIGID	Typical
34	M34	N61	N60			RIGID	None	None	RIGID	Typical
35	HR3	N71	N66		270	Handrail	Beam	Pipe	A53 Gr.B	Typical
36	M36	N69	N70			RIGID	None	None	RIGID	Typical
37	M37	N67	N64			RIGID	None	None	RIGID	Typical
38	M38	N65	N68			RIGID	None	None	RIGID	Typical
39	HR2	N79	N74		270	Handrail	Beam	Pipe	A53 Gr.B	Typical
40	M40	N77	N78			RIGID	None	None	RIGID	Typical
41	M41	N75	N72			RIGID	None	None	RIGID	Typical
42	M42	N73	N76			RIGID	None	None	RIGID	Typical
43	M44	N80	N81		180	Handrail Angle	Beam	Single Angle	A36 Gr.36	Typical
44	M45	N82	N83		180	Handrail Angle	Beam	Single Angle	A36 Gr.36	Typical
45	M46	N84	N85		180	Handrail Angle	Beam	Single Angle	A36 Gr.36	Typical

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[LB]
1	General				
2	RIGID		18	54	0
3	Total General		18	54	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	C4x5x4x0.375	3	102	132.867

Material Takeoff (Continued)

	Material	Size	Pieces	Length[in]	Weight[LB]
7	A36 Gr.36	L2.5x2.5x3	3	39.5	10.083
8	A36 Gr.36	L3X3X4	6	763.8	311.877
9	A36 Gr.36	LL3x3x4x0	3	141	115.15
10	A53 Gr.B	PIPE_2.0	9	648	187.425
11	A53 Gr.B	PIPE_2.5	3	468	213.661
12	Total HR Steel		27	2162.2	971.063

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(M...	Surface(Plate/Wall)
1	Self Weight	DL		-1			21		3	
2	Wind Load AZI 0	WLZ					42			
3	Wind Load AZI 30	None					42			
4	Wind Load AZI 60	None					42			
5	Wind Load AZI 90	WLX					42			
6	Wind Load AZI 120	None					42			
7	Wind Load AZI 150	None					42			
8	Wind Load AZI 180	None					42			
9	Wind Load AZI 210	None					42			
10	Wind Load AZI 240	None					42			
11	Wind Load AZI 270	None					42			
12	Wind Load AZI 300	None					42			
13	Wind Load AZI 330	None					42			
14	Distr. Wind Load Z	WLZ						45		
15	Distr. Wind Load X	WLX						45		
16	Ice Weight	OL1					21	45	3	
17	Ice Wind Load AZI 0	OL2					42			
18	Ice Wind Load AZI ...	None					42			
19	Ice Wind Load AZI ...	None					42			
20	Ice Wind Load AZI ...	OL3					42			
21	Ice Wind Load AZI ...	None					42			
22	Ice Wind Load AZI ...	None					42			
23	Ice Wind Load AZI ...	None					42			
24	Ice Wind Load AZI ...	None					42			
25	Ice Wind Load AZI ...	None					42			
26	Ice Wind Load AZI ...	None					42			
27	Ice Wind Load AZI ...	None					42			
28	Ice Wind Load AZI ...	None					42			
29	Distr. Ice Wind Loa...	OL2						45		
30	Distr. Ice Wind Loa...	OL3						45		
31	Seismic Load Z	ELZ			-.293		21			
32	Seismic Load X	ELX	-.293				21			
33	Service Live Loads	LL				1				
34	Maintenance Load ...	LL				1				
35	Maintenance Load ...	LL				1				
36	Maintenance Load ...	LL				1				
37	Maintenance Load ...	LL				1				
38	Maintenance Load ...	LL				1				
39	Maintenance Load ...	LL				1				
40	Maintenance Load ...	LL				1				
41	Maintenance Load ...	LL				1				
42	Maintenance Load ...	LL				1				
43	BLC 1 Transient Ar...	None						30		
44	BLC 16 Transient ...	None						30		

Load Combinations

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4DL	Yes	Y		1	1.4																		
2	1.2DL + 1WL AZI 0	Yes	Y		1	1.2	2	1	14	1	15													
3	1.2DL + 1WL AZI 30	Yes	Y		1	1.2	3	1	14	.866	15	.5												
4	1.2DL + 1WL AZI 60	Yes	Y		1	1.2	4	1	14	.5	15	.866												
5	1.2DL + 1WL AZI 90	Yes	Y		1	1.2	5	1	14		15	1												
6	1.2DL + 1WL AZI 120	Yes	Y		1	1.2	6	1	14	-.5	15	.866												
7	1.2DL + 1WL AZI 150	Yes	Y		1	1.2	7	1	14	-.8...	15	.5												
8	1.2DL + 1WL AZI 180	Yes	Y		1	1.2	8	1	14	-1	15													
9	1.2DL + 1WL AZI 210	Yes	Y		1	1.2	9	1	14	-.8...	15	-.5												
10	1.2DL + 1WL AZI 240	Yes	Y		1	1.2	10	1	14	-.5	15	-.8...												
11	1.2DL + 1WL AZI 270	Yes	Y		1	1.2	11	1	14		15	-1												
12	1.2DL + 1WL AZI 300	Yes	Y		1	1.2	12	1	14	.5	15	-.8...												
13	1.2DL + 1WL AZI 330	Yes	Y		1	1.2	13	1	14	.866	15	-.5												
14	0.9DL + 1WL AZI 0	Yes	Y		1	.9	2	1	14	1	15													
15	0.9DL + 1WL AZI 30	Yes	Y		1	.9	3	1	14	.866	15	.5												
16	0.9DL + 1WL AZI 60	Yes	Y		1	.9	4	1	14	.5	15	.866												
17	0.9DL + 1WL AZI 90	Yes	Y		1	.9	5	1	14		15	1												
18	0.9DL + 1WL AZI 120	Yes	Y		1	.9	6	1	14	-.5	15	.866												
19	0.9DL + 1WL AZI 150	Yes	Y		1	.9	7	1	14	-.8...	15	.5												
20	0.9DL + 1WL AZI 180	Yes	Y		1	.9	8	1	14	-1	15													
21	0.9DL + 1WL AZI 210	Yes	Y		1	.9	9	1	14	-.8...	15	-.5												
22	0.9DL + 1WL AZI 240	Yes	Y		1	.9	10	1	14	-.5	15	-.8...												
23	0.9DL + 1WL AZI 270	Yes	Y		1	.9	11	1	14		15	-1												
24	0.9DL + 1WL AZI 300	Yes	Y		1	.9	12	1	14	.5	15	-.8...												
25	0.9DL + 1WL AZI 330	Yes	Y		1	.9	13	1	14	.866	15	-.5												
26	1.2D + 1.0Di	Yes	Y		1	1.2	16	1																
27	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	17	1	29	1	30											
28	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	18	1	29	.866	30	.5										
29	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	19	1	29	.5	30	.866										
30	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	20	1	29		30	1										
31	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	21	1	29	-.5	30	.866										
32	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	22	1	29	-.8...	30	.5										
33	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	23	1	29	-1	30											
34	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	24	1	29	-.8...	30	-.5										
35	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	25	1	29	-.5	30	-.8...										
36	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	26	1	29		30	-1										
37	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	27	1	29	.5	30	-.8...										
38	1.2D + 1.0Di +1.0Wi A...	Yes	Y		1	1.2	16	1	28	1	29	.866	30	-.5										
39	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31	1	32															
40	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31	.866	32	.5														
41	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31	.5	32	.866														
42	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31		32	1														
43	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31	-.5	32	.866														
44	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31	-.8...	32	.5														
45	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31	-1	32															
46	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31	-.8...	32	-.5														
47	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31	-.5	32	-.8...														
48	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31		32	-1														
49	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31	.5	32	-.8...														
50	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.239	31	.866	32	-.5														
51	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31	1	32															
52	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31	.866	32	.5														
53	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31	.5	32	.866														
54	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31		32	1														
55	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31	-.5	32	.866														
56	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31	-.8...	32	.5														

Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
57	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31	-1	32															
58	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31	-.8...	32	-.5														
59	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31	-.5	32	-.8...														
60	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31		32	-1														
61	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31	.5	32	-.8...														
62	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.861	31	.866	32	-.5														
63	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	2	.259	14	.259	15		33	1.5										
64	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	3	.259	14	.224	15	.129	33	1.5										
65	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	4	.259	14	.129	15	.224	33	1.5										
66	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	5	.259	14		15	.259	33	1.5										
67	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	6	.259	14	-.1...	15	.224	33	1.5										
68	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	7	.259	14	-.2...	15	.129	33	1.5										
69	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	8	.259	14	-.2...	15		33	1.5										
70	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	9	.259	14	-.2...	15	-.1...	33	1.5										
71	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	10	.259	14	-.1...	15	-.2...	33	1.5										
72	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	11	.259	14		15	-.2...	33	1.5										
73	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	12	.259	14	.129	15	-.2...	33	1.5										
74	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	13	.259	14	.224	15	-.1...	33	1.5										
75	1.2DL + 1.5LL	Yes	Y		1	1.2	33	1.5																
76	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	2	.065	14	.065	15											
77	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	3	.065	14	.056	15	.032										
78	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	4	.065	14	.032	15	.056										
79	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	5	.065	14		15	.065										
80	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	6	.065	14	-.0...	15	.056										
81	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	7	.065	14	-.0...	15	.032										
82	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	8	.065	14	-.0...	15											
83	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	9	.065	14	-.0...	15	-.0...										
84	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	10	.065	14	-.0...	15	-.0...										
85	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	11	.065	14		15	-.0...										
86	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	12	.065	14	.032	15	-.0...										
87	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	13	.065	14	.056	15	-.0...										
88	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	2	.065	14	.065	15											
89	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	3	.065	14	.056	15	.032										
90	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	4	.065	14	.032	15	.056										
91	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	5	.065	14		15	.065										
92	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	6	.065	14	-.0...	15	.056										
93	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	7	.065	14	-.0...	15	.032										
94	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	8	.065	14	-.0...	15											
95	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	9	.065	14	-.0...	15	-.0...										
96	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	10	.065	14	-.0...	15	-.0...										
97	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	11	.065	14		15	-.0...										
98	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	12	.065	14	.032	15	-.0...										
99	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	13	.065	14	.056	15	-.0...										
100	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	2	.065	14	.065	15											
101	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	3	.065	14	.056	15	.032										
102	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	4	.065	14	.032	15	.056										
103	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	5	.065	14		15	.065										
104	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	6	.065	14	-.0...	15	.056										
105	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	7	.065	14	-.0...	15	.032										
106	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	8	.065	14	-.0...	15											
107	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	9	.065	14	-.0...	15	-.0...										
108	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	10	.065	14	-.0...	15	-.0...										
109	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	11	.065	14		15	-.0...										
110	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	12	.065	14	.032	15	-.0...										
111	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	13	.065	14	.056	15	-.0...										
112	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	2	.065	14	.065	15											
113	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	3	.065	14	.056	15	.032										

Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
114	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	4	.065	14	.032	15	.056												
115	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	5	.065	14		15	.065												
116	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	6	.065	14	-.0...	15	.056												
117	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	7	.065	14	-.0...	15	.032												
118	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	8	.065	14	-.0...	15													
119	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	9	.065	14	-.0...	15	-.0...												
120	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	10	.065	14	-.0...	15	-.0...												
121	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	11	.065	14		15	-.0...												
122	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	12	.065	14	.032	15	-.0...												
123	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	13	.065	14	.056	15	-.0...												
124	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	2	.065	14	.065	15													
125	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	3	.065	14	.056	15	.032												
126	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	4	.065	14	.032	15	.056												
127	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	5	.065	14		15	.065												
128	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	6	.065	14	-.0...	15	.056												
129	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	7	.065	14	-.0...	15	.032												
130	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	8	.065	14	-.0...	15													
131	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	9	.065	14	-.0...	15	-.0...												
132	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	10	.065	14	-.0...	15	-.0...												
133	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	11	.065	14		15	-.0...												
134	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	12	.065	14	.032	15	-.0...												
135	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	13	.065	14	.056	15	-.0...												
136	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	2	.065	14	.065	15													
137	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	3	.065	14	.056	15	.032												
138	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	4	.065	14	.032	15	.056												
139	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	5	.065	14		15	.065												
140	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	6	.065	14	-.0...	15	.056												
141	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	7	.065	14	-.0...	15	.032												
142	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	8	.065	14	-.0...	15													
143	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	9	.065	14	-.0...	15	-.0...												
144	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	10	.065	14	-.0...	15	-.0...												
145	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	11	.065	14		15	-.0...												
146	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	12	.065	14	.032	15	-.0...												
147	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	13	.065	14	.056	15	-.0...												
148	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	2	.065	14	.065	15													
149	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	3	.065	14	.056	15	.032												
150	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	4	.065	14	.032	15	.056												
151	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	5	.065	14		15	.065												
152	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	6	.065	14	-.0...	15	.056												
153	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	7	.065	14	-.0...	15	.032												
154	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	8	.065	14	-.0...	15													
155	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	9	.065	14	-.0...	15	-.0...												
156	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	10	.065	14	-.0...	15	-.0...												
157	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	11	.065	14		15	-.0...												
158	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	12	.065	14	.032	15	-.0...												
159	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	13	.065	14	.056	15	-.0...												
160	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	2	.065	14	.065	15													
161	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	3	.065	14	.056	15	.032												
162	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	4	.065	14	.032	15	.056												
163	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	5	.065	14		15	.065												
164	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	6	.065	14	-.0...	15	.056												
165	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	7	.065	14	-.0...	15	.032												
166	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	8	.065	14	-.0...	15													
167	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	9	.065	14	-.0...	15	-.0...												
168	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	10	.065	14	-.0...	15	-.0...												
169	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	11	.065	14		15	-.0...												
170	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	12	.065	14	.032	15	-.0...												

Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
171	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	13	.065	14	.056	15	-.0...										
172	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	2	.065	14	.065	15											
173	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	3	.065	14	.056	15	.032										
174	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	4	.065	14	.032	15	.056										
175	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	5	.065	14		15	.065										
176	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	6	.065	14	-.0...	15	.056										
177	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	7	.065	14	-.0...	15	.032										
178	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	8	.065	14	-.0...	15											
179	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	9	.065	14	-.0...	15	-.0...										
180	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	10	.065	14	-.0...	15	-.0...										
181	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	11	.065	14		15	-.0...										
182	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	12	.065	14	.032	15	-.0...										
183	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	13	.065	14	.056	15	-.0...										

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N21	max	2215.711	6	3179.549	33	649.524	2	839.87	14	1593.33	18	151.206	6
2		min	-2210.836	24	-394.994	14	-531.618	20	-7621.9...	33	-1611.4...	12	-150.284	24
3	N23	max	1600.265	4	3170.601	37	2180.239	15	3805.134	37	2321.193	22	6579.185	37
4		min	-1512.321	22	-370.987	18	-2242.8...	9	-395.242	18	-2338.8...	4	-669.85	18
5	N25	max	1376.624	18	3170.675	29	2250.868	14	3802.799	29	2014.853	14	661.075	22
6		min	-1477.308	12	-371.018	22	-2301.1...	8	-410.762	22	-2033.3...	8	-6580.8...	29
7	Totals:	max	4772.012	17	8768.306	38	4901.198	2						
8		min	-4772.012	23	2164.733	56	-4901.1...	20						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*...	phi*...	phi*...	phi*...	...	Eqn
1	MH1	L3X3X4	.865	84	32	.143	84	z	33	2387...	46656	1688...	3698...		H2-1
2	MH4	L3X3X4	.863	84	28	.143	84	z	29	2387...	46656	1688...	3698...		H2-1
3	MH3	L3X3X4	.860	84	36	.142	84	z	37	2387...	46656	1688...	3697...		H2-1
4	MS2	C4x5x4x0...	.631	34	30	.213	34	y	13	1324...	1488...	1222...	2330...		H1-...
5	MS1	C4x5x4x0...	.628	34	36	.213	34	y	9	1324...	1488...	1222...	2330...		H1-...
6	MS3	C4x5x4x0...	.626	34	34	.196	34	y	5	1324...	1488...	1222...	2330...		H1-...
7	MP9	PIPE_2.0	.623	61	12	.149	61		13	1491...	32130	1871...	1871...		H1-...
8	M46	L2.5x2.5x3	.622	0	2	.153	0	y	9	2759...	2919...	872....	1971...		H2-1
9	MP3	PIPE_2.0	.621	25	9	.151	61		9	1491...	32130	1871...	1871...		H1-...
10	M44	L2.5x2.5x3	.617	0	10	.153	0	y	5	2759...	2919...	872....	1971...		H2-1
11	M45	L2.5x2.5x3	.610	0	6	.153	0	y	13	2759...	2919...	872....	1971...		H2-1
12	MH6	L3X3X4	.609	43.297	36	.027	43.297	z	10	1484...	46656	1688...	3122...		H2-1
13	MP4	PIPE_2.0	.609	48.75	27	.140	13.125		4	2380...	32130	1871...	1871...		H1-...
14	MH5	L3X3X4	.608	43.297	28	.028	43.297	z	2	1484...	46656	1688...	3122...		H2-1
15	MP7	PIPE_2.0	.608	48.75	35	.138	13.125		12	2380...	32130	1871...	1871...		H1-...
16	MH2	L3X3X4	.607	43.297	32	.027	43.297	z	6	1484...	46656	1688...	3122...		H2-1
17	MP1	PIPE_2.0	.603	48.75	32	.140	13.125		8	2380...	32130	1871...	1871...		H1-...
18	MP6	PIPE_2.0	.585	25	30	.149	61		5	1491...	32130	1871...	1871...		H1-...
19	HR1	PIPE_2.5	.486	71.5	34	.239	9.75		3	3396...	50715	3596...	3596...	1	H1-...
20	HR2	PIPE_2.5	.485	71.5	30	.239	9.75		11	3396...	50715	3596...	3596...	1	H1-...
21	HR3	PIPE_2.5	.485	71.5	38	.240	9.75		7	3396...	50715	3596...	3596...	1	H1-...
22	MP5	PIPE_2.0	.467	48.75	6	.097	48.75		2	2380...	32130	1871...	1871...		H1-...
23	MP8	PIPE_2.0	.466	48.75	2	.101	48.75		10	2380...	32130	1871...	1871...		H1-...
24	MP2	PIPE_2.0	.454	48.75	10	.095	48.75		6	2380...	32130	1871...	1871...		H1-...
25	M11	LL3x3x4x0	.240	47	10	.039	0	z	5	7637...	93312	6480	4360...		H1-...
26	M5	LL3x3x4x0	.239	47	2	.039	0	z	9	7637...	93312	6480	4360...		H1-...
27	M4	LL3x3x4x0	.236	47	6	.039	0	z	13	7637...	93312	6480	4360...		H1-...

APPENDIX D

ADDITIONAL CALCUATIONS

INFINIGY

Bolt Calculation Tool, V1.6.1

PROJECT DATA	
Site Name:	BERLIN / LAVIANA ORCHARD
Site Number:	876382
Connection Description:	Platform to Tower

MAXIMUM BOLT LOADS		
Bolt Tension:	16696.10	lbs
Bolt Shear:	5017.77	lbs

WORST CASE BOLT LOADS[1]		
Bolt Tension:	16696.10	lbs
Bolt Shear:	78.40	lbs

BOLT PROPERTIES		
Bolt Type:	Bolt	-
Bolt Diameter:	1	in
Bolt Grade:	A325	-
# of Bolts:	2	-
Threads Excluded?	No	-

[1] *Worst case bolt loads correspond to Load combination #33 on member MS3 in RISA-3D, which causes the maximum demand on the bolts.*

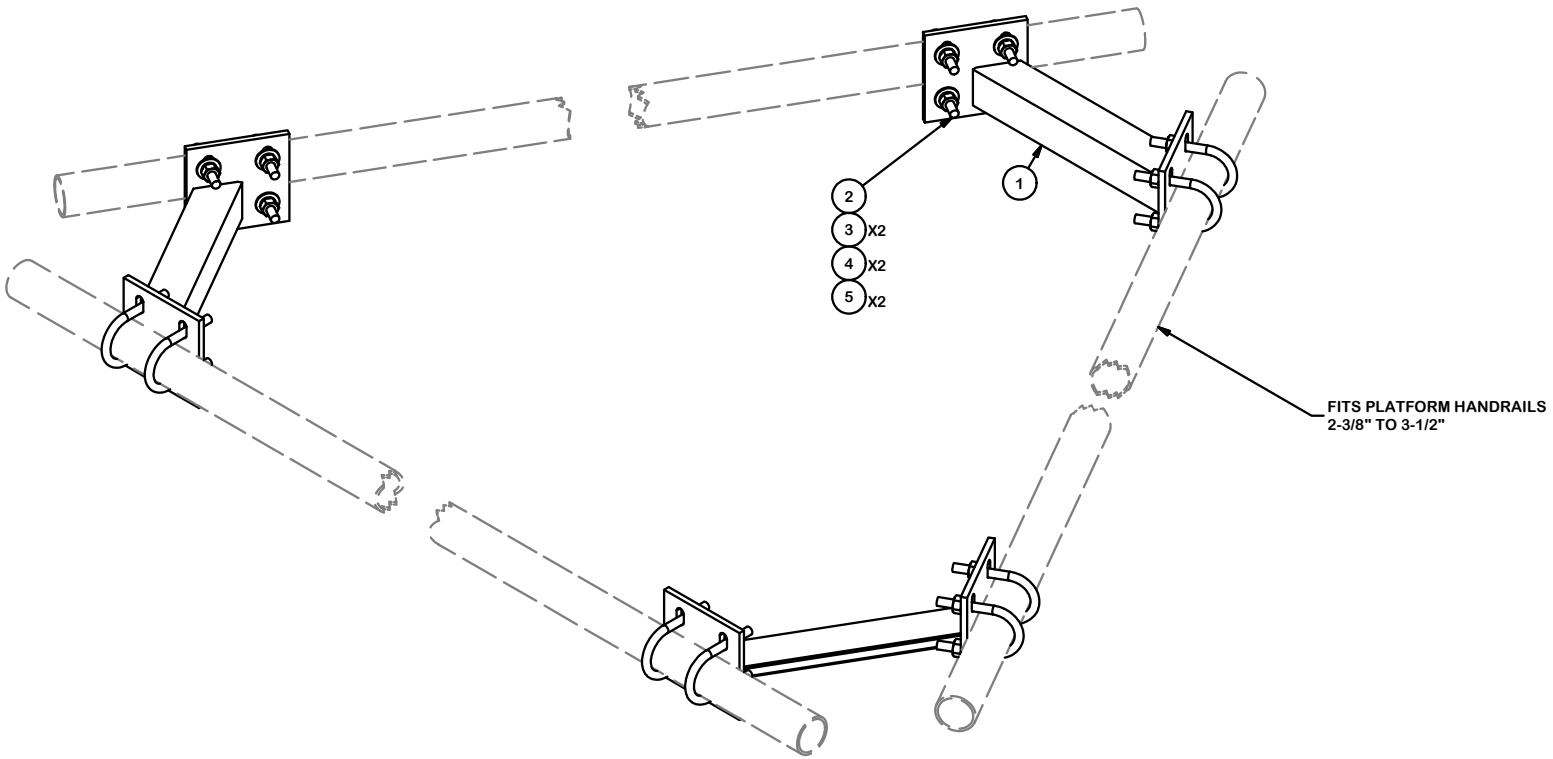
Member Information
J nodes of MS3, MS1, MS2,

BOLT CHECK		
Tensile Strength	54516.96	
Shear Strength	35342.92	
Max Tensile Usage	30.6%	
Max Shear Usage	14.2%	
Interaction Check (Worst Case)	0.09	***≤1.05***
Result	Pass	

APPENDIX E

MOUNT MODIFICATION DESIGN DRAWINGS (MDD) / SUPPLEMENTAL DRAWINGS

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
2	12	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.73	8.78
2	12	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.73	8.78
2	12	X-UB1358	1/2" X 3-5/8" X 5-1/2" X 3" U-BOLT (HDG.)		0.73	8.78
3	24	G12FW	1/2" HDG USS FLATWASHER		0.03	0.82
4	24	G12LW	1/2" HDG LOCKWASHER		0.01	0.33
5	24	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.72
					TOTAL WT. #	66.76



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION: ANGLE HANDRAIL CORNER PLATE KIT

SITE PRO 1 — A valmont COMPANY

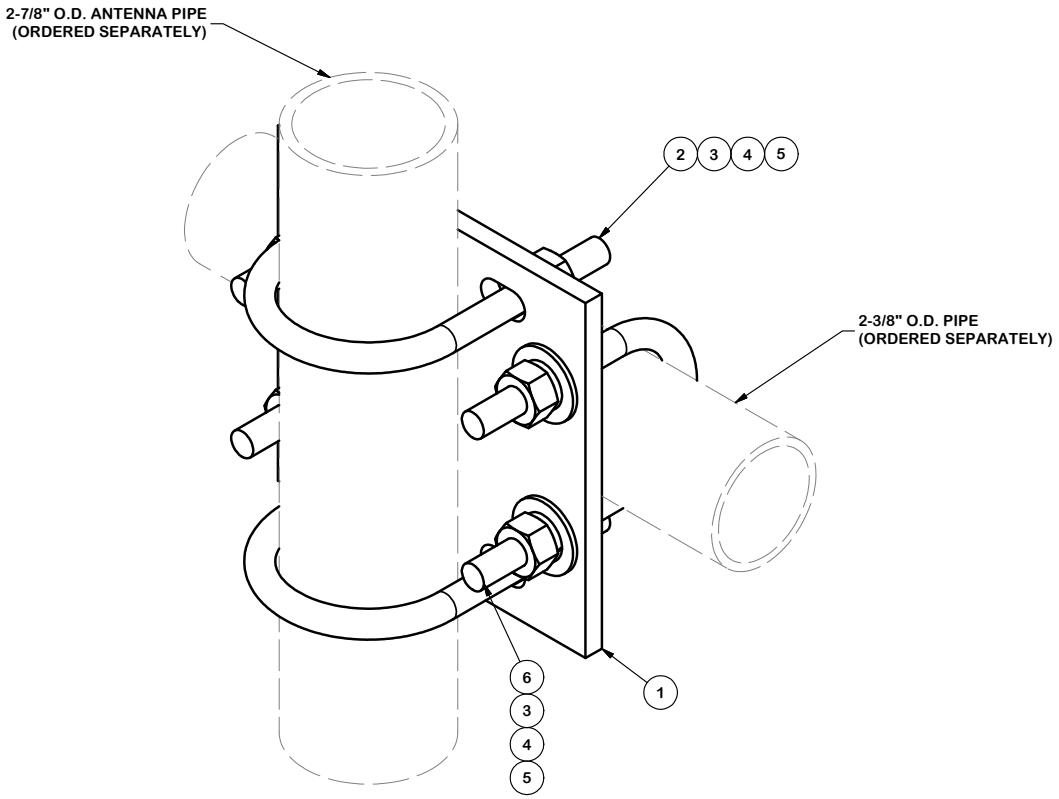
Engineering Support Team: 1-888-753-7446

Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
	CEK 5/13/2014		AHCP	1 OF 1

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 5/23/2014	AHCP

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	SCX2	CROSSOVER PLATE	7 in	4.80	4.80
2	2	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.66	1.31
3	8	G12FW	1/2" HDG USS FLATWASHER		0.03	0.27
4	8	G12LW	1/2" HDG LOCKWASHER		0.01	0.11
5	8	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.57
6	2	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	1.25
					TOTAL WT. #	8.39



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION: CROSSOVER PLATE KIT

SITE PRO 1 — A valmont COMPANY

Engineering Support Team: 1-888-753-7446

Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
	CEK 6/30/2011		SCX2-K	1 OF 1
CLASS / SUB	DRAWING USAGE	CHECKED BY	DWG. NO.	
	SHOP	BMC 7/1/2011	SCX2-K	

SITE PRO 1
A valmont COMPANY

Product Info

Pxxx: Bulk Pipe

Features:

- Factory cut end, hot-dip galvanized pipe

Construction:

- ASTM A53 Grade B
- Schedule 40

Design Criteria:

- ASTM A53 Grade B (Yield Fy = 35 ksi [240 MPa] / Tensile Fu = 60 ksi [415 MPa])
- Hot dip galvanized in accordance with ASTM A123 requirements

Part #	Length	OD x Length (in)	Weight
P263	5′-3″	2-3/8″ x 63″	20 lb
P272	6′-0″	2-3/8″ x 72″	22 lb
P284	7′-0″	2-3/8″ x 84″	26 lb
P296	8′-0″	2-3/8″ x 96″	30 lb
P2120	10′-0″	2-3/8″ x 120″	37 lb
P2126	10′-6″	2-3/8″ x 126″	39 lb
P2150	12′-6″	2-3/8″ x 150″	46 lb
P2174	14′-6″	2-3/8″ x 174″	53 lb
P3084	7′-0″	2-7/8″ x 84″	41 lb
P3096	8′-0″	2-7/8″ x 96″	47 lb
P30120	10'-0"	2-7/8" x 120"	58 lb
P30126	10′-6″	2-7/8″ x 126″	61 lb
P30150	12′-6″	2-7/8″ x 150″	73 lb
P30174	14′-6″	2-7/8″ x 174″	84 lb
P360	5′-0″	3-1/2″ x 60″	38 lb
P372	6′-0″	3-1/2″ x 72″	46 lb
P396	8′-0″	3-1/2″ x 96″	61 lb
P3150	12′-6″	3-1/2″ x 150″	95 lb
P3160	13′-4″	3-1/2″ x 160″	101 lb
P3174	14′-6″	3-1/2″ x 174″	110 lb
P3216	18′-0″	3-1/2″ x 216″	137 lb
P472	6′-0″	4-1/2″ x 72″	65 lb
P4126	10′-6″	4-1/2″ x 126″	114 lb

created on: 04/05/2019

Fox Hill Telecom

Radio Frequency Emissions Analysis Report

T-Mobile

Site ID: CT11604B

Sprint Berlin Kensington
1684 Chamberlain Highway
Berlin, CT 06037

August 12, 2022

Fox Hill Telecom Project Number: 221564

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**41.95 %**

Fox Hill Telecom

August 12, 2022

T-MOBILE
Attn: RF Manager
35 Griffin Road South
Bloomfield, CT 06009

Emissions Analysis for Site: **CT11604B – Sprint Berlin Kensington**

Fox Hill Telecom, Inc ("Fox Hill") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **1684 Chamberlain Highway, Berlin, CT**, for the purpose of determining whether the emissions from the Proposed T-MOBILE Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

General population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz & 700 MHz bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **1684 Chamberlain Highway, Berlin, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-MOBILE is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20
LTE	1900 MHz (PCS)	4	40
GSM	1900 MHz (PCS)	1	15
LTE	2100 MHz (AWS)	4	40
LTE / 5G NR	2500 MHz (BRS)	8	20

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600 MHz, 700 MHz, 1900 MHz (PCS), 2100 MHz (AWS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	RFS APXVAALL24_43-U-NA20	121
A	2	Commscope VV-65B-R1	121
A	3	Ericsson AIR6419 B41	121
B	1	RFS APXVAALL24_43-U-NA20	121
B	2	Commscope VV-65B-R1	121
B	3	Ericsson AIR6419 B41	121
C	1	RFS APXVAALL24_43-U-NA20	121
C	2	Commscope VV-65B-R1	121
C	3	Ericsson AIR6419 B41	121

Table 2: Antenna Data

All calculations were done with respect to uncontrolled / general population threshold limits.

RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	RFS APXVAALL24_43-U-NA20	600 MHz / 700 MHz	13.65 / 13.85	4	120	2,824.56	1.83
Antenna A2	Commscope VV-65B-R1	1900 MHz (PCS) / 2100 MHz (AWS)	16.55 / 16.85	9	335	15,654.24	4.26
Antenna A3	Ericsson AIR6419 B41	2500 MHz (BRS)	21.5	8	160	22,600.60	6.14
						Sector A Composite MPE%	**12.23**
Antenna B1	RFS APXVAALL24_43-U-NA20	600 MHz / 700 MHz	13.65 / 13.85	4	120	2,824.56	1.83
Antenna B2	Commscope VV-65B-R1	1900 MHz (PCS) / 2100 MHz (AWS)	16.55 / 16.85	9	335	15,654.24	4.26
Antenna B3	Ericsson AIR6419 B41	2500 MHz (BRS)	21.5	8	160	22,600.60	6.14
						Sector B Composite MPE%	**12.23**
Antenna C1	RFS APXVAALL24_43-U-NA20	600 MHz / 700 MHz	13.65 / 13.85	4	120	2,824.56	1.83
Antenna C2	Commscope VV-65B-R1	1900 MHz (PCS) / 2100 MHz (AWS)	16.55 / 16.85	9	335	15,654.24	4.26
Antenna C3	Ericsson AIR6419 B41	2500 MHz (BRS)	21.5	8	160	22,600.60	6.14
						Sector C Composite MPE%	**12.23**

Table 3: T-MOBILE Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
T-MOBILE – Max Per Sector Value	**12.23 %**
DISH	15.05 %
Town	0.01 %
MetroPCS	1.43 %
Clearwire	0.14 %
Verizon Wireless	7.20 %
AT&T	5.89 %
Site Total MPE %:	**41.95 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	12.23 %
T-MOBILE Sector B Total:	12.23 %
T-MOBILE Sector C Total:	12.23 %
Site Total:	41.95 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 600 MHz LTE / 5G NR	2	926.96	121	5.04	600 MHz	400	1.26%
T-Mobile 700 MHz LTE	2	485.32	121	2.64	700 MHz	467	0.57%
T-Mobile 1900 MHz (PCS) LTE	4	1,807.42	121	19.65	1900 MHz (PCS)	1000	1.97%
T-Mobile 1900 MHz (PCS) GSM	1	677.78	121	1.84	1900 MHz (PCS)	1000	0.18%
T-Mobile 2100 MHz (AWS) LTE	4	1,936.69	121	21.06	2100 MHz (AWS)	1000	2.11%
T-Mobile 2500 MHz (BRS) LTE / 5G NR	8	2,825.08	121	61.44	2500 MHz (BRS)	1000	6.14%
						Total:	**12.23%**

Table 6: T-MOBILE Maximum Sector MPE Power Values

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-MOBILE facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-MOBILE Sector	Power Density Value (%)
Sector A:	12.23 %
Sector B:	12.23 %
Sector C:	12.23 %
T-MOBILE Maximum Total (per sector):	12.23 %
Site Total:	41.95 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **41.95 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
Principal RF Engineer
Fox Hill Telecom, Inc
Holden, MA 01520
(978)660-3998

T-Mobile

T-MOBILE SITE NUMBER: CT11604B
T-MOBILE SITE NAME: SPRINT BERLIN KENSINGTON
SITE TYPE: MONOPOLE
TOWER HEIGHT: 133'-0"

BUSINESS UNIT #: 876382
SITE ADDRESS: 1684 CHAMBERLAIN HIGHWAY BERLIN, CT 6037
COUNTY: HARTFORD
JURISDICTION: HARTFORD COUNTY

4CT11604B_ANCHOR: **67E5998E_1XAIR+1OP+1QP**

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	BERLIN / LAVIANA ORCHARD
SITE ADDRESS:	1684 CHAMBERLAIN HIGHWAY BERLIN, CT 6037
COUNTY:	HARTFORD
MAP/PARCEL #:	VERIFY
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.58985600° (41° 35' 23.07")
LONGITUDE:	-72.80529400° (-72° 48' 19.20")
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	±354 FT
CURRENT ZONING:	TBD
JURISDICTION:	HARTFORD COUNTY
OCCUPANCY CLASSIFICATION:	TBD
TYPE OF CONSTRUCTION:	TBD
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	TBD ---- ----
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	TBD
TELCO PROVIDER:	TBD

PROJECT TEAM

A&E FIRM:	INFINIGY 500 WEST OFFICE CENTER DR. SUITE 150, FORT WASHINGTON, PA 19034
CROWN CASTLE USA INC. DISTRICT CONTACTS:	1500 CORPORATE DRIVE CANONSBURG, PA 15317
	TBD - PROJECT MANAGER -
	TBD - CONSTRUCTION MANAGER -

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	SITE PLAN & ENLARGED SITE PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4	PLUMBING DIAGRAM
C-5	EQUIPMENT SPECS
C-6	EQUIPMENT SPECS
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

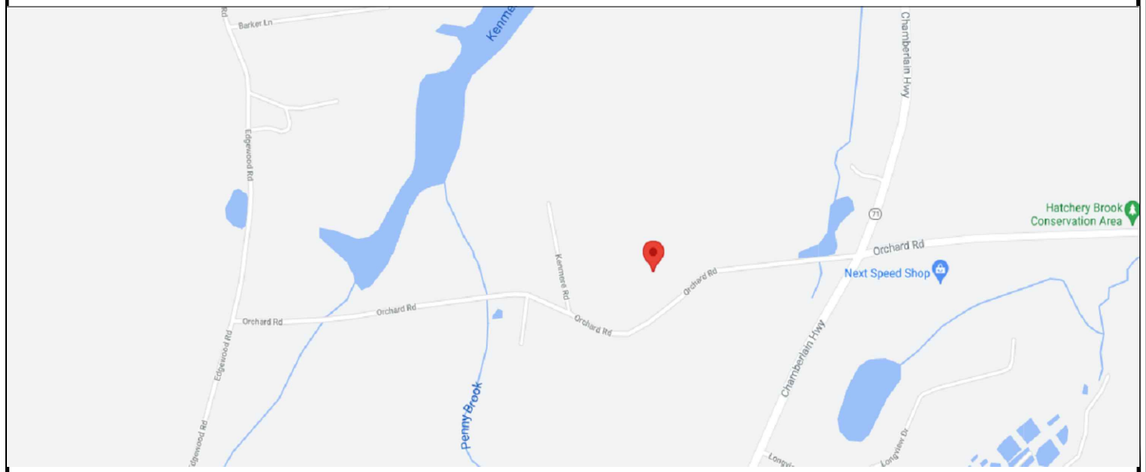
THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (3) ANTENNAS
- REMOVE (6) TMAS
- REMOVE (12) COAX CABLES
- INSTALL (9) ANTENNAS
- INSTALL (6) RRHS
- INSTALL ANTENNA MOUNT MODS

GROUND SCOPE OF WORK:
- REMOVE (1) EQUIPMENT CABINET
- INSTALL (1) 6160 & (1) B160 BATTERY CABINET
- INSTALL (2) PSU4813 VOLTAGE BOOSTER IN (P) CABINET
- INSTALL (1) CSR IXRE ROUTER IN (P) CABINET
- INSTALL (1) RP6651 IN (P) CABINET
- INSTALL (1) RP6651 IN (E) RBS 6201 CABINET

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER.

LOCATION MAP



NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2018 IBC
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	MORRISON HERSHFIELD
DATED:	06/28/2022
MOUNT ANALYSIS:	INFINIGY
DATED:	06/14/2022
RFDS REVISION:	7
DATED:	04/26/2022
ORDER ID:	621160]
REVISION:	0

CALL CONNECTICUT ONE CALL
(800) 922-4455 CBYD.COM
CALL 2 WORKING DAYS
BEFORE YOU DIG!

APPROVALS

APPROVAL	SIGNATURE	DATE
PROPERTY OWNER OR REP.		
LAND USE PLANNER		
T-MOBILE		
OPERATIONS		
RF		
NETWORK		
BACKHAUL		
CONSTRUCTION MANAGER		

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
500 West Office Center Dr.
Suite 150 | Fort Washington, PA 19034
www.infinigy.com

T-MOBILE SITE NUMBER:
CT11604B

BU #: **876382**
BERLIN / LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 6037

EXISTING 133'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07/11/22	RCD	PRELIMINARY	SS
0	08/18/2022	RCD	100% FINALS	SS

STATE OF CONNECTICUT
SHUHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER

08/18/2022

SHEET NUMBER: T-1
REVISION: 0

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
   THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: T–MOBILE
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
   #4 BARS AND SMALLER..40 ksi
   #5 BARS AND LARGER..60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH..............3"
   CONCRETE EXPOSED TO EARTH OR WEATHER:
      #6 BARS AND LARGER..2"
      #5 BARS AND SMALLER...1–1/2"
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
      SLAB AND WALLS..3/4"
      BEAMS AND COLUMNS...1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE

SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
500 West Office Center Dr.
Suite 150 | Fort Washington, PA 19034
www.infinigy.com

T-MOBILE SITE NUMBER:
CT11604B

BU #: **876382**
BERLIN / LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 6037

EXISTING 133'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07/11/22	RCD	PRELIMINARY	SS
0	08/18/2022	RCD	100% FINALS	SS

SHUHEI SAKANOUE
34916

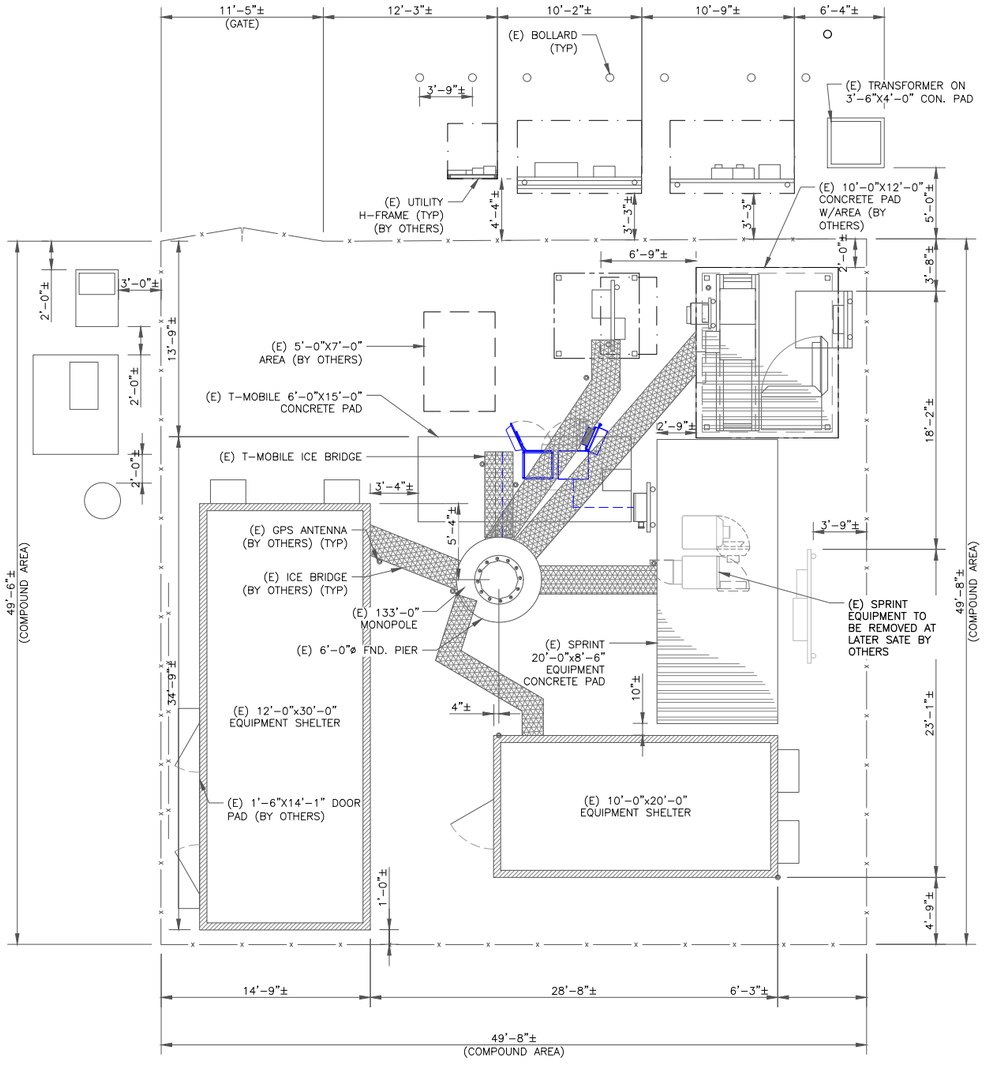
08/18/2022

IT IS A VIOLATION OF LAW FOR ANY PERSON,
UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER,
TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-2
REVISION: 0

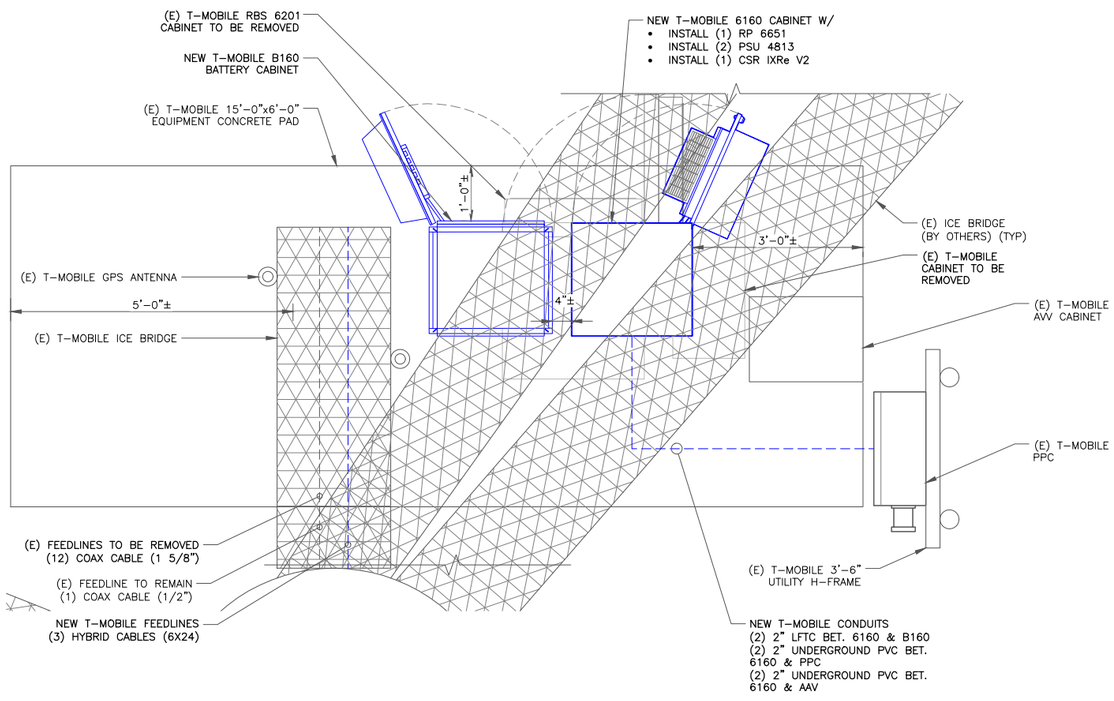
NOTE:

1. PLANS BASED ON SITE PLAN PROVIDED BY TOWER OWNER AND SITE VISIT PERFORMED BY INFINIGY. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING T-MOBILE EQUIPMENT.



1 SITE PLAN
SCALE: 4' 2' 0 4' 3/16"=1'-0" (FULL SIZE) 3/32"=1'-0" (11x17)

N



2 ENLARGED SITE PLAN
SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)

N

T-Mobile

35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
500 West Office Center Dr.
Suite 150 | Fort Washington, PA 19034
www.infinigy.com

T-MOBILE SITE NUMBER:
CT11604B

BU #: **876382**
BERLIN / LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 6037

EXISTING 133'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07/11/22	RCD	PRELIMINARY	SS
0	08/18/2022	RCD	100% FINALS	SS

STATE OF CONNECTICUT
SHUHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER

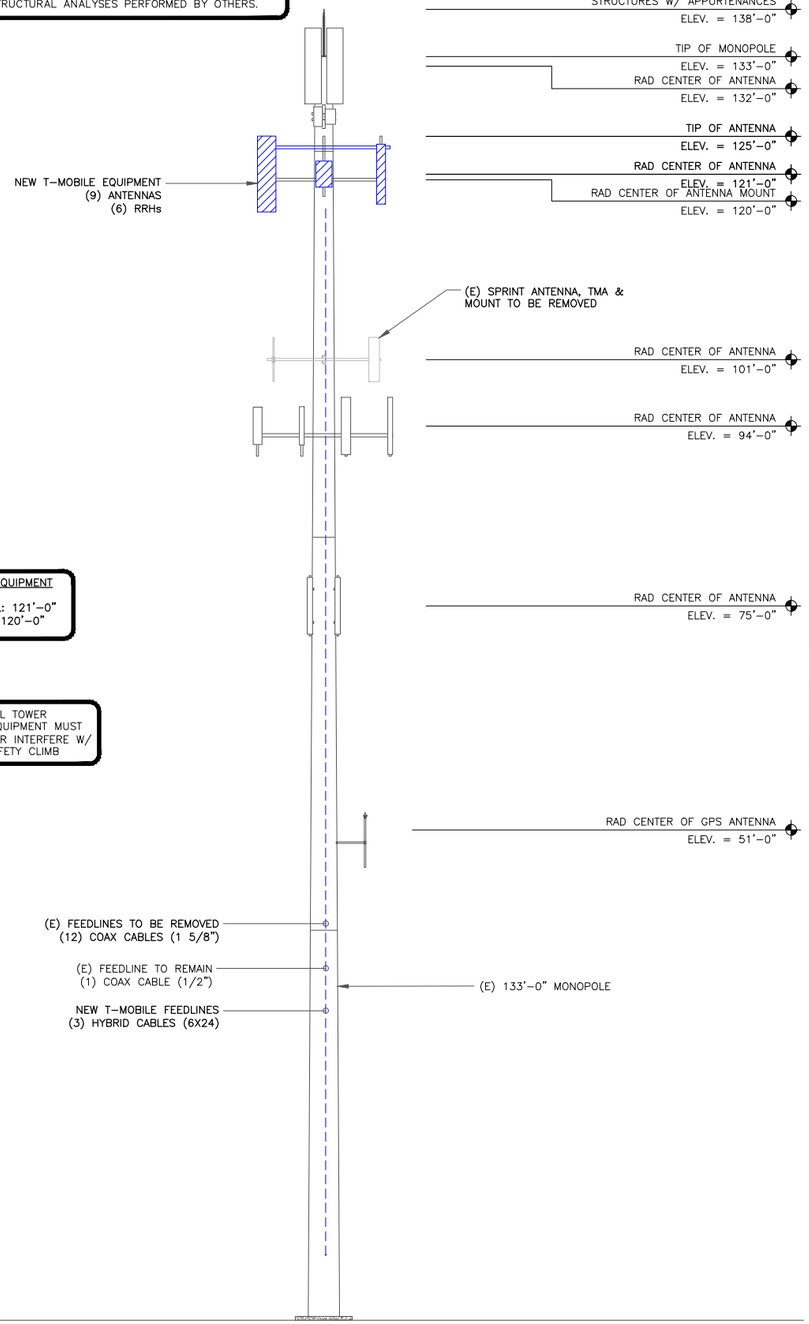
08/18/2022

SHEET NUMBER: C-1

REVISION: 0

NOTES:

1. ELEVATION BASED ON DRAWING PROVIDED BY TOWER OWNER. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.
2. INFINIGY HAS NOT EVALUATED THE TOWER OR MOUNT STRUCTURE AND ASSUMES NO RESPONSIBILITY FOR THEIR STRUCTURAL INTEGRITY REGARDING PROPOSED LOADINGS. FINAL INSTALLATION SHALL COMPLY WITH RESULTS OF PASSING STRUCTURAL ANALYSES PERFORMED BY OTHERS.

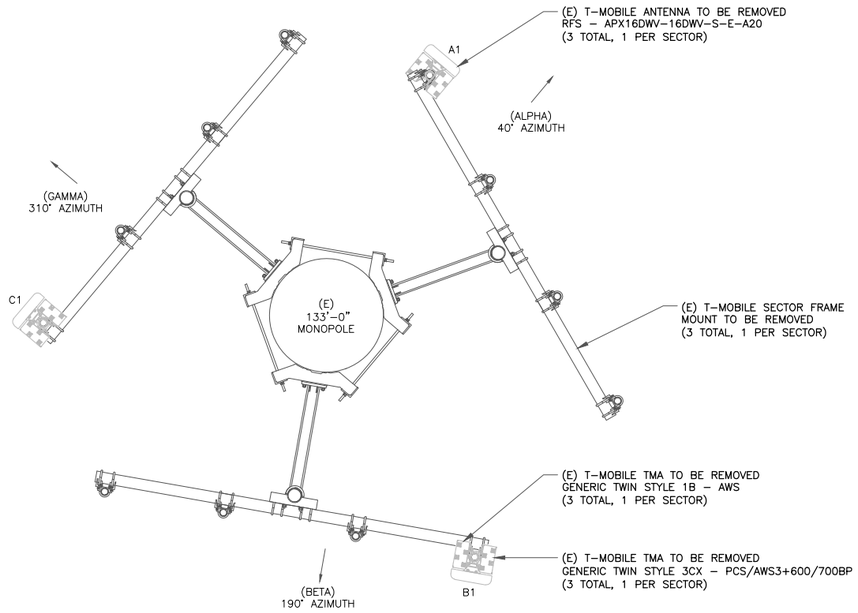


T-MOBILE EQUIPMENT

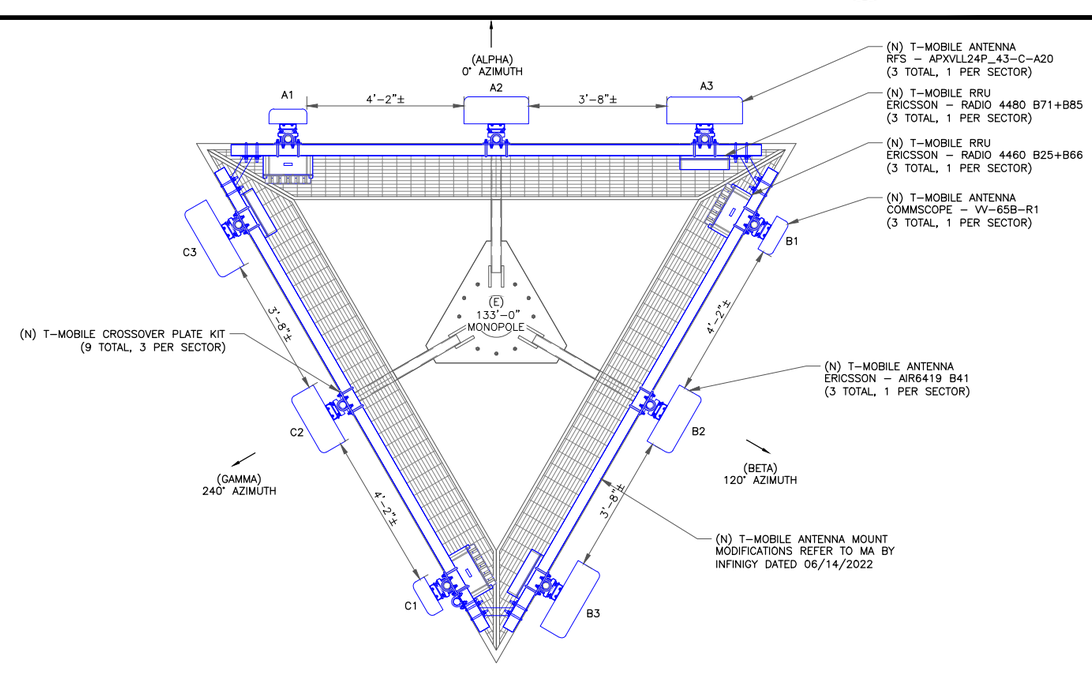
ANTENNA CL: 121'-0"
MOUNT CL: 120'-0"

ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB

1 FINAL ELEVATION
SCALE: 4' 2' 0 4' 3/16"=1'-0" (FULL SIZE) 3/32"=1'-0" (11x17)



2 EXISTINGL ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)



3 FINAL ANTENNA LAYOUT
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
500 West Office Center Dr.
Suite 150 | Fort Washington, PA 19034
www.infinigy.com

T-MOBILE SITE NUMBER:
CT11604B

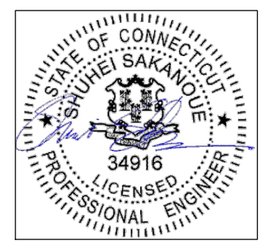
BU #: **876382**
BERLIN / LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 6037

EXISTING 133'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07/11/22	RCD	PRELIMINARY	SS
0	08/18/2022	RCD	100% FINALS	SS



08/18/2022

SHEET NUMBER:	REVISION:
C-2	0

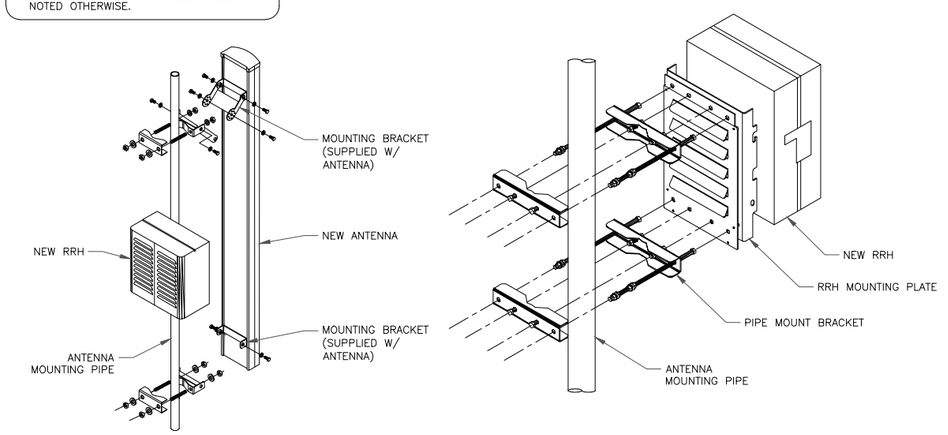
ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	L1900, G1900, L2100,	121'–0"	0°	COMMSCOPE	VV–65B–R1	0	–	(1) ERICSSON – RRUS 4460 B25+B65	(1) 6X24 HYBRID 50M IN LENGTH
ALPHA	A2	L2500. N2500	121'–0"	0°	ERICSSON	ERICSSON – AIR6419 B41	0	–	–	–
ALPHA	A3	L700, L600, N600	121'–0"	0°	RFS	APXVAALL24_43–U–NA20	0	–	(1) ERICSSON – RRUS 4480 B71+B85	–
BETA	B1	L1900, G1900, L2100,	121'–0"	120°	COMMSCOPE	VV–65B–R1	0	–	(1) ERICSSON – RRUS 4460 B25+B65	(1) 6X24 HYBRID 50M IN LENGTH
BETA	B2	L2500. N2500	121'–0"	120°	ERICSSON	ERICSSON – AIR6419 B41	0	–	–	–
BETA	B3	L700, L600, N600	121'–0"	120°	RFS	APXVAALL24_43–U–NA20	0	–	(1) ERICSSON – RRUS 4480 B71+B85	–
GAMMA	C1	L1900, G1900, L2100,	121'–0"	240°	COMMSCOPE	VV–65B–R1	0	–	(1) ERICSSON – RRUS 4460 B25+B65	(1) 6X24 HYBRID 50M IN LENGTH
GAMMA	C2	L2500. N2500	121'–0"	240°	ERICSSON	ERICSSON – AIR6419 B41	0	–	–	–
GAMMA	C3	L700, L600, N600	121'–0"	240°	RFS	APXVAALL24_43–U–NA20	0	–	(1) ERICSSON – RRUS 4480 B71+B85	–

1 ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

INSTALLER NOTES:

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



NOTE:

1. CONTRACTOR SHALL INSTALL 3RD DUAL RRH MOUNT TO ACCOMMODATE ALL RRH BRACKETS HOLES IF NECESSARY.

2 ANTENNA WITH RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
500 West Office Center Dr.
Suite 150 | Fort Washington, PA 19034
www.infinigy.com

T-MOBILE SITE NUMBER:
CT11604B

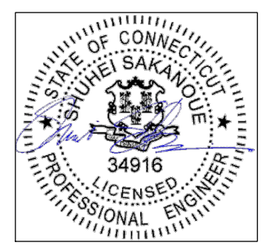
BU #: **876382**
BERLIN / LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 6037

EXISTING 133'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07/11/22	RCD	PRELIMINARY	SS
0	08/18/2022	RCD	100% FINALS	SS

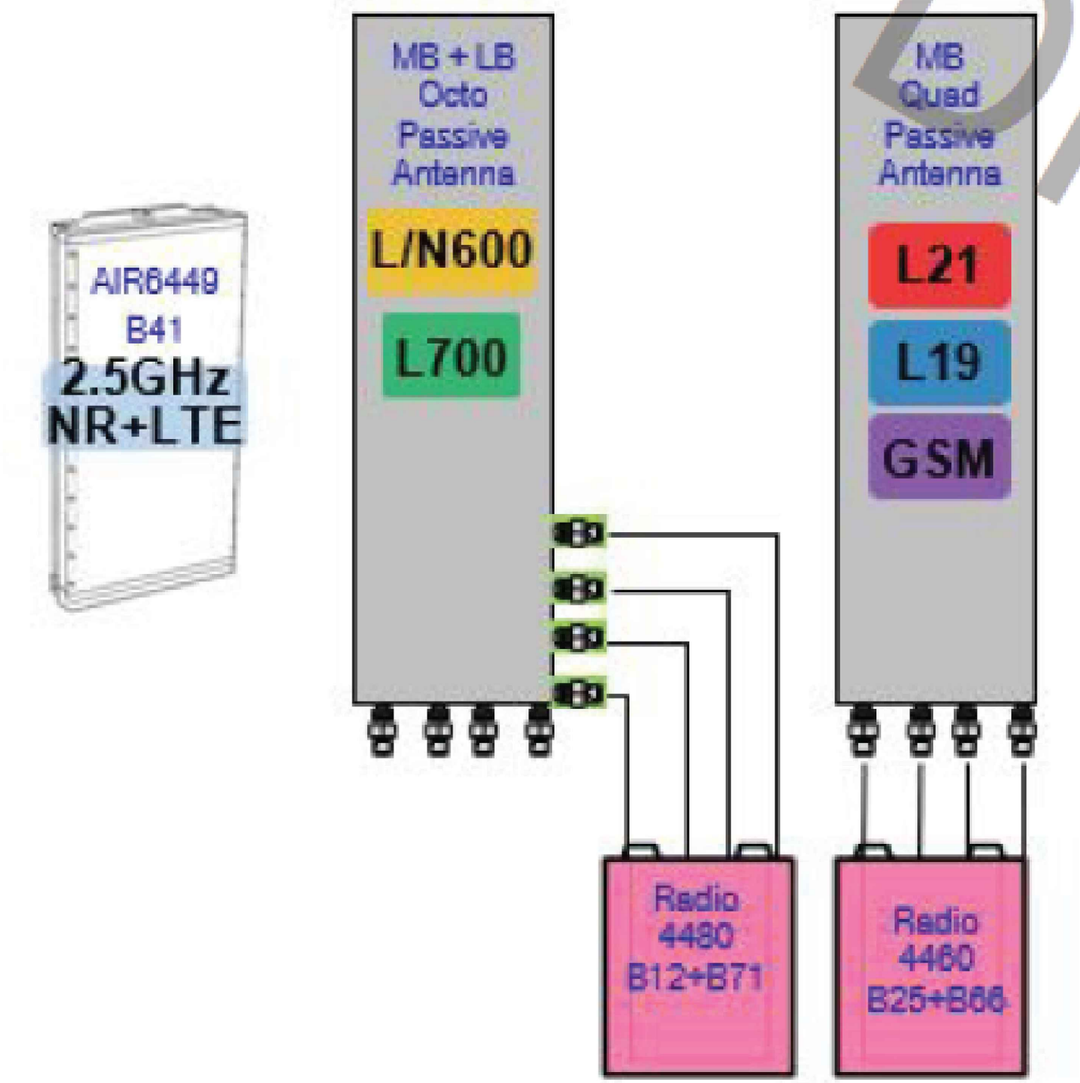


08/18/2022

SHEET NUMBER: C-3

REVISION: 0

67E5A998E.JPG



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
500 West Office Center Dr.
Suite 150 | Fort Washington, PA 19034
www.infinigy.com

T-MOBILE SITE NUMBER:
CT11604B

BU #: **876382**
BERLIN / LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 6037

EXISTING 133'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07/11/22	RCD	PRELIMINARY	SS
0	08/18/2022	RCD	100% FINALS	SS

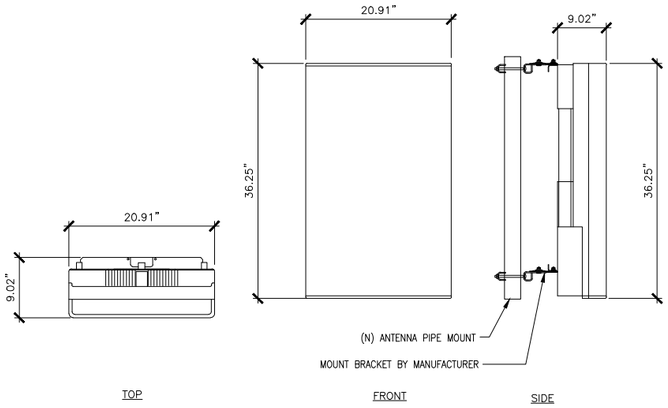
STATE OF CONNECTICUT
SHUHEI SAKANOUE
34916
LICENSED PROFESSIONAL ENGINEER

08/18/2022

SHEET NUMBER: C-4

REVISION: 0

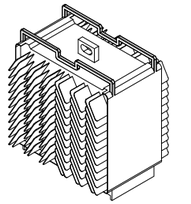
MANUFACTURER: ERICSSON
MODEL: AIR6419 B41
WEIGHT: 96.5 LBS (W/ MOUNT BRACKET 113)
DIMENSIONS: 36.25"H. X 20.91"W. X 9.02"D.
FREQUENCY: REFER TO RF DATA SHEET

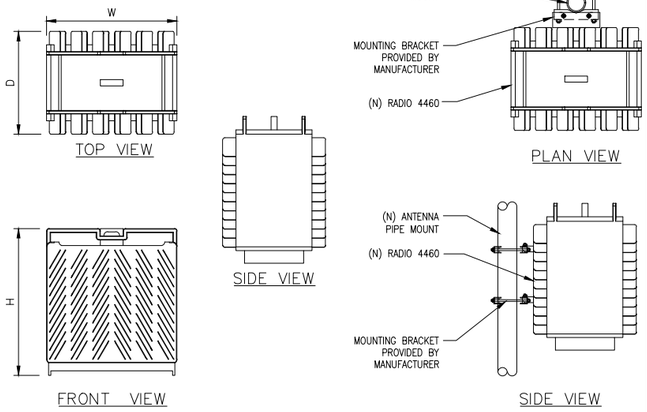


1 (N) AIR6419 B41 ANTENNA SPEC
SCALE: NOT TO SCALE

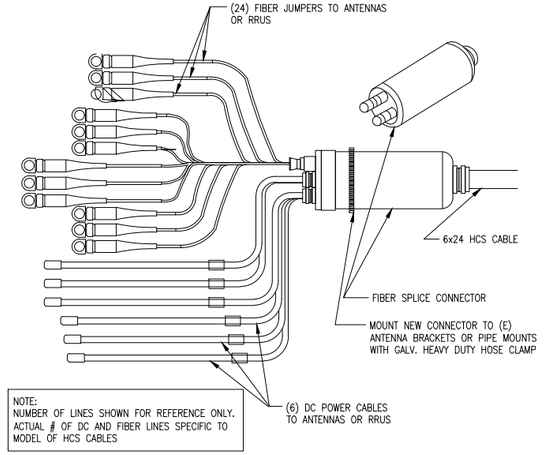
ERICSSON RADIO-4460 B25 B66

DIMENSIONS, WxDxH:	17.0"x15.1"x11.9"
MAX OUTPUT POWER:	4x80W (2x(2x80W))
TOTAL WEIGHT:	109 lbs
TEMPERATURE:	-40° TO 55° C



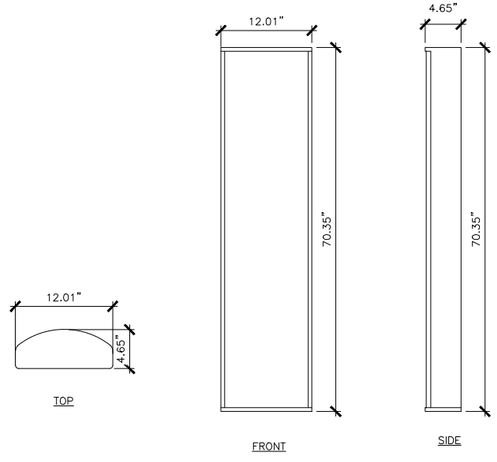


2 (N) RADIO 4460 SPEC
SCALE: NOT TO SCALE



3 (N) 6X24 HCS CABLE DETAIL
SCALE: NOT TO SCALE

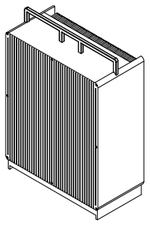
MANUFACTURER: COMMSCOPE
MODEL: VV-65B-R1
WEIGHT: 41.67 LBS
DIMENSIONS: 70.35"H. X 12.01"W. X 4.65"D.
FREQUENCY: REFER TO RF DATA SHEET

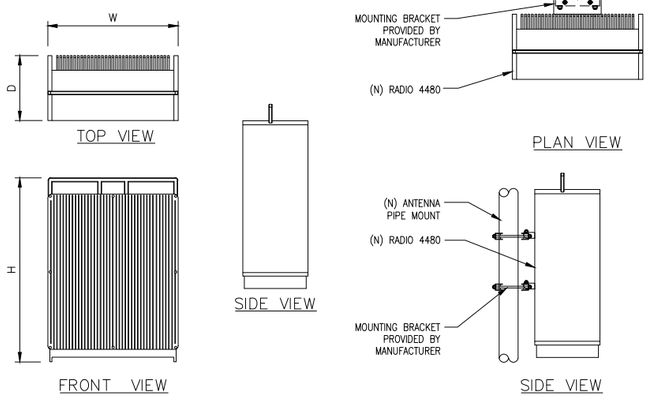


4 (N) COMMSCOPE VV-65B-R1 ANTENNA SPEC
SCALE: NOT TO SCALE

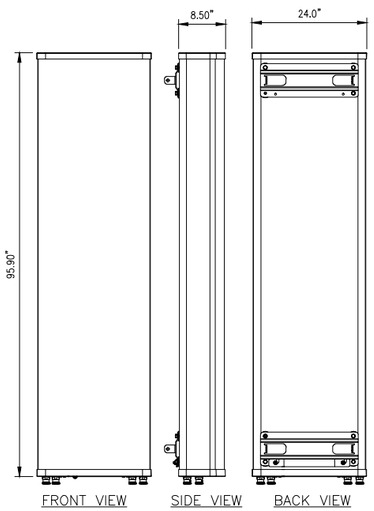
ERICSSON RADIO-4480 B71 B85

DIMENSIONS, WxDxH:	21.8"x15.7"x7.5"
MAX OUTPUT POWER:	4x80W (2x(2x80W))
TOTAL WEIGHT:	93 lbs
TEMPERATURE:	-40° TO 55° C

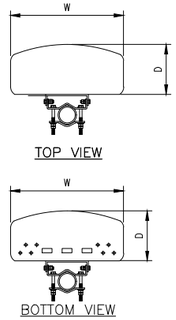




5 (N) RADIO 4480 SPEC
SCALE: NOT TO SCALE



700MHz RFS ANTENNAS	
MODEL	WEIGHT (lb)
(8') APXVAALL24_43-U-NA20	149.90
WEIGHT W/ MOUNTING BRACKET (lb):	154



6 (N) APXVAALL24_43-U-NA20 ANTENNA SPEC
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
500 West Office Center Dr.
Suite 150 | Fort Washington, PA 19034
www.infinigy.com

T-MOBILE SITE NUMBER:
CT11604B

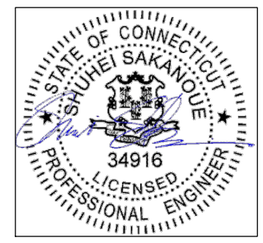
BU #: **876382**
BERLIN / LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 6037

EXISTING 133'-0"
MONOPOLE

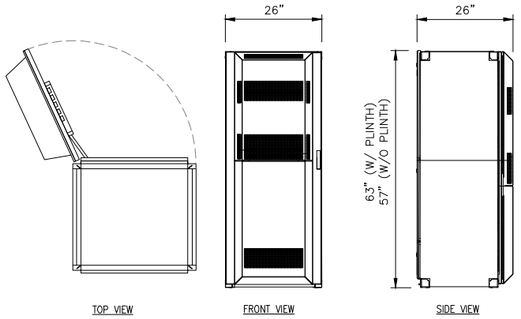
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07/11/22	RCD	PRELIMINARY	SS
0	08/18/2022	RCD	100% FINALS	SS



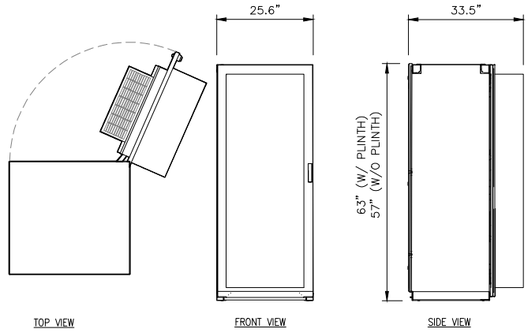
08/18/2022

SHEET NUMBER: C-5
REVISION: 0



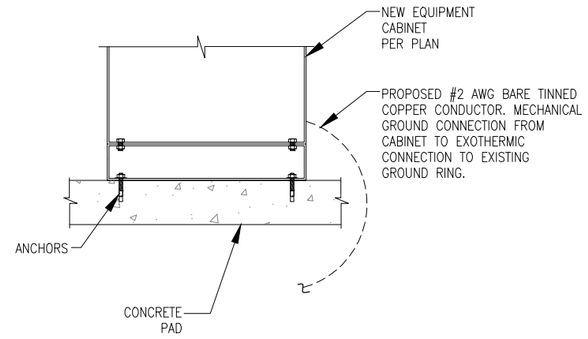
ERICSSON MODEL NO.:	B160
RACK SPACE:	19U
DIMENSIONS, HxWxD:	63"x26"x26" (W/ 6" PLINTH)
CABINET WEIGHT, EMPTY:	485 LBS
MAXIMUM WEIGHT:	2100± LBS

1 (N) B160 CABINET DETAIL
SCALE: NOT TO SCALE

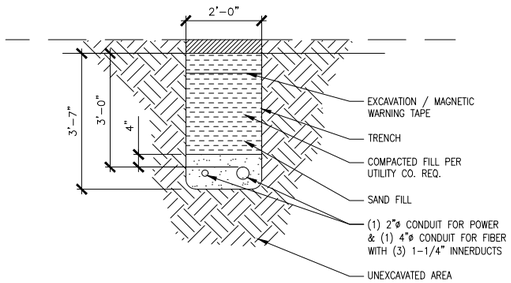


ERICSSON MODEL NO.:	6160
RACK SPACE:	19U
DIMENSIONS, HxWxD:	63"x25.6"x25.6" (W/ 6" PLINTH)
CABINET WEIGHT, EMPTY:	410 LBS
MAXIMUM WEIGHT:	770± LBS

2 (N) 6160 CABINET DETAIL
SCALE: NOT TO SCALE



3 (N) EQUIPMENT CABINET MOUNTING DETAIL
SCALE: NOT TO SCALE



4 (N) CONDUIT TRENCH DETAIL
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
500 West Office Center Dr.
Suite 150 | Fort Washington, PA 19034
www.infinigy.com

T-MOBILE SITE NUMBER:
CT11604B

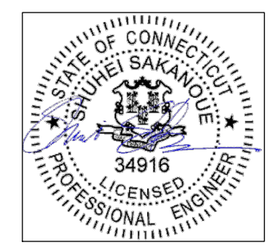
BU #: **876382**
BERLIN / LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 6037

EXISTING 133'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07/11/22	RCD	PRELIMINARY	SS
0	08/18/2022	RCD	100% FINALS	SS



08/18/2022

SHEET NUMBER: C-6

REVISION: 0

NOTES:

1. EXISTING DISTRIBUTION PANEL WAS NOT ACCESSIBLE DURING SITE VISIT PERFORMED BY INFINIGY. CONTRACTOR SHALL INFORM ENGINEER IF THERE ARE ANY DISCREPANCIES IN PANEL SCHEDULE.

T-MOBILE PANEL SCHEDULE

MAIN: 200A MAIN BREAKER			**VOTAGE/PHASE:** 120/240V, 1-PHASE, 3-WIRE					**SHORT CIRCUIT CURRENT RATING:** --			
MOUNTING: INSIDE PPC ENCLOSURE			**ENCLOSURE:** NEMA 3R					**SURGE PROTECTION DEVICE:** YES			
					PHASE LOADS (VA)						
DESCRIPTION	LOAD (VA)	C or NC	C/B	CIR No.	A	B	CIR No.	C/B	C or NC	LOAD (VA)	DESCRIPTION
6160	**8750**	**C**	**100**	**1**	8751		7	60	NC	1	SURGE ARRESTOR
	8750	**C**		**2**		8751	8		NC	1	
6160 GFI	**180**	**NC**	**20**	**3**	180		9	20	NC	0	OFF
TELCO FAN	200	NC	10	4		200	10	20	NC	0	OFF
MMBS (TO BE OFF)	0	C	100	5	180		11	20	NC	180	EXTERNAL RECEPTACLE
	0	C		6		180	12	20	NC	180	INTERNAL RECEPTACLE
BASE LOAD (VA) =					9111	9131					
25% OF CONTINUOUS LOAD (VA) =					2188	2188					
TOTAL LOAD (VA) =					11299	11319					
TOTAL LOAD (A) =					94	94					

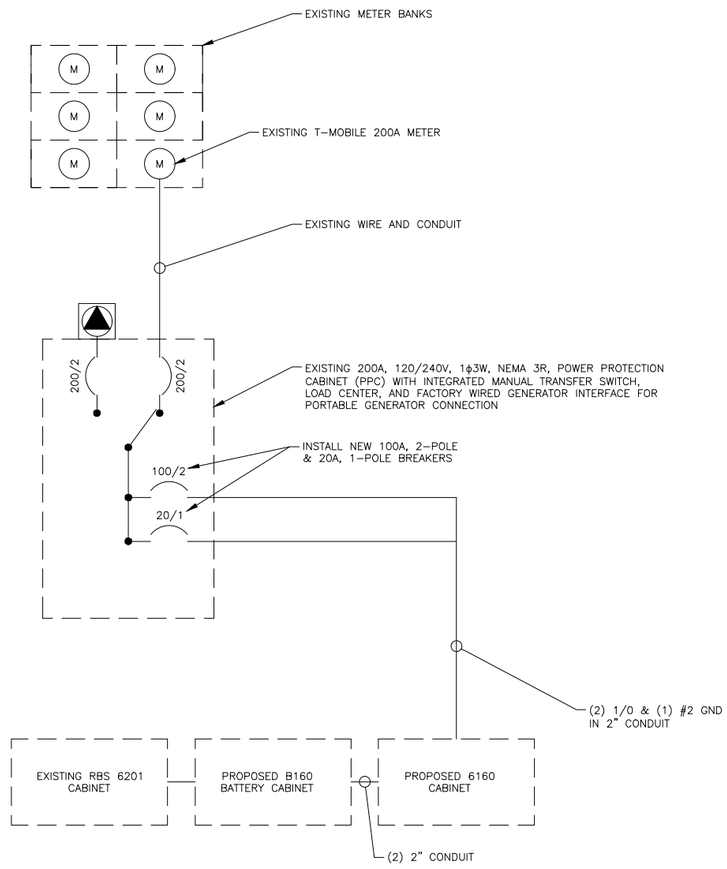
C = CONTINUOUS LOAD; NC = NON-CONTINUOUS LOAD

NEW BREAKER TO BE SAME TYPE AND HAVE SAME AIC RATING AS EXISTING. CUSTOMER HAS NOT PROVIDED LOADS FOR EQUIPMENT CABINETS THEREFORE THE CABINET LOADS SHOWN ARE ESTIMATED VALUES.

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE

NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN–2, XHHW, OR XHHW–2 UNLESS NOTED OTHERWISE.
2. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE–LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. ALL GROUNDING AND BONDING PER THE NEC.



2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
500 West Office Center Dr.
Suite 150 | Fort Washington, PA 19034
www.infinigy.com

T-MOBILE SITE NUMBER:
CT11604B

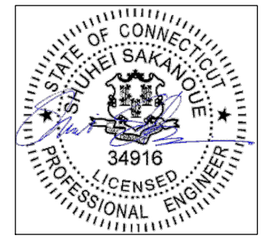
BU #: **876382**
BERLIN / LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 6037

EXISTING 133'-0"
MONOPOLE

ISSUED FOR:

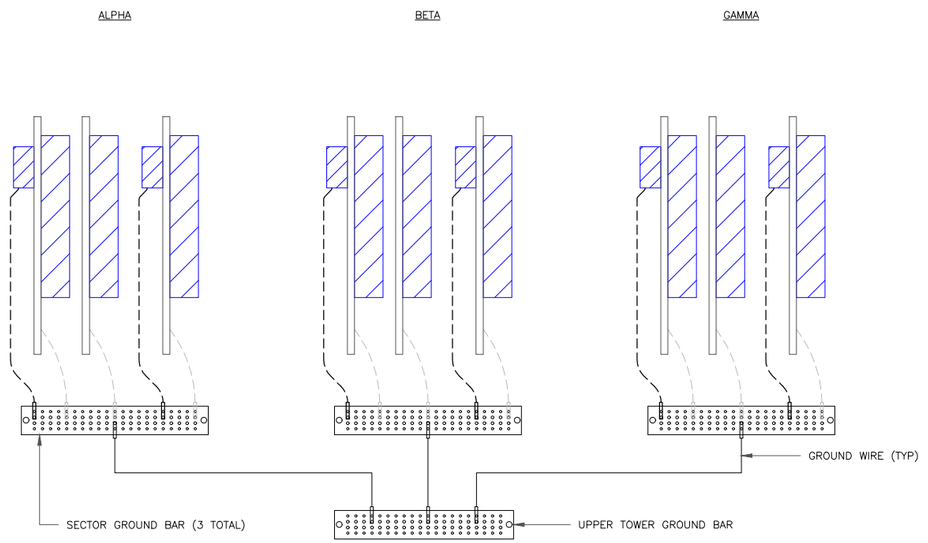
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07/11/22	RCD	PRELIMINARY	SS
0	08/18/2022	RCD	100% FINALS	SS



08/18/2022

SHEET NUMBER: E-1

REVISION: 0



NOTE:

ALL NEW GROUNDS TO BE #6 STRANDED COPPER WITH GREEN INSULATION UNLESS NOTED OTHERWISE.

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile

35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE

1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY

FROM ZERO TO INFINIGY
the solutions are endless

500 West Office Center Dr.
Suite 150 | Fort Washington, PA 19034
www.infinigy.com

T-MOBILE SITE NUMBER:
CT11604B

BU #: **876382**
BERLIN / LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 6037

EXISTING 133'-0"
MONOPOLE

ISSUED FOR:

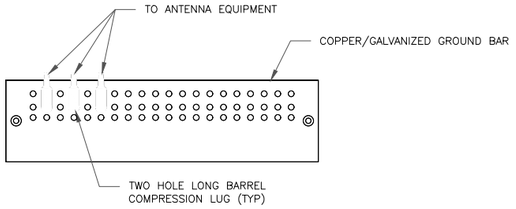
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07/11/22	RCD	PRELIMINARY	SS
0	08/18/2022	RCD	100% FINALS	SS

STATE OF CONNECTICUT
SHUHEI SAKANOUE
34916
LICENSED
PROFESSIONAL ENGINEER

08/18/2022

SHEET NUMBER: G-1

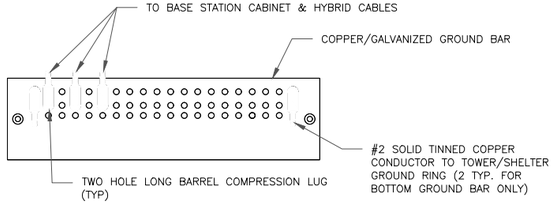
REVISION: 0



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

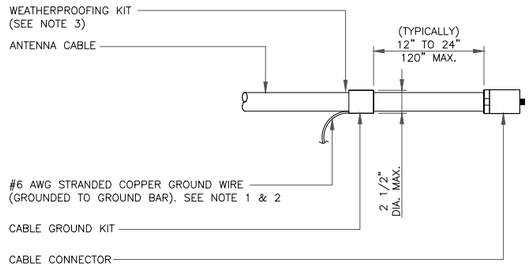
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

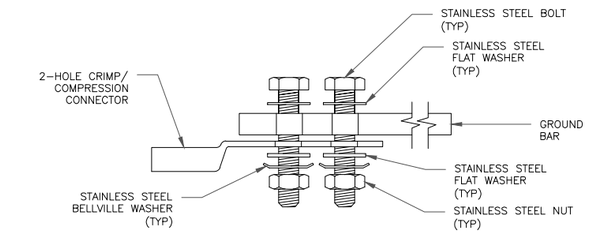
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



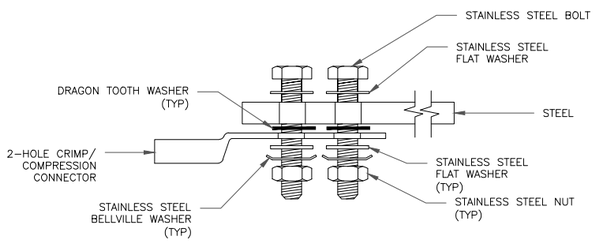
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

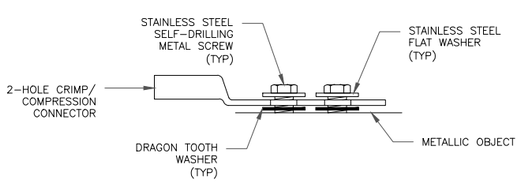
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS



SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

4 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1500 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
500 West Office Center Dr.
Suite 150 | Fort Washington, PA 19034
www.infinigy.com

T-MOBILE SITE NUMBER:
CT11604B

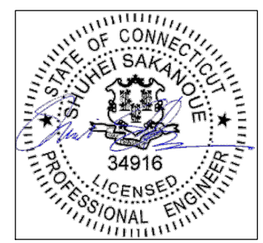
BU #: **876382**
BERLIN / LAVIANA ORCHARD

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 6037

EXISTING 133'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	07/11/22	RCD	PRELIMINARY	SS
0	08/18/2022	RCD	100% FINALS	SS



08/18/2022

SHEET NUMBER: G-2

REVISION: 0